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CHEETAL

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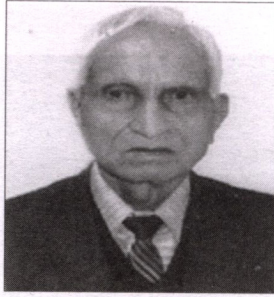
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Musk Deer Photo : Bhagat Singh

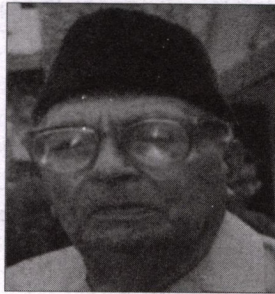


Steller's Sea Eagle Photo: Rishad K. Naoroji



Obituary

The sad demise of Sri Praveen Singh Rawat on 4th December 2012 is a great loss to Wildlife Preservation Society of India. Late Sri Rawat was associated as administrative officer with the Society for a long time. After retiring from U.P. Forest Department, he joined the Society and worked ceaselessly almost in honorary capacity with meager salary till he breathed his last. He used to walk to the office and back home a distance of over 4km every day. He had gone to office on 3rd Dec. 2012 and did his duty till the afternoon of that date. He complained of uneasiness on 4th morning when his doctor son took him to hospital but he expired before his arrival to hospital. He used to meticulously maintain Society's accounts and other records in his handwriting. At 84 he dressed smartly and lived with dignity. His departure is a great loss to the Society which is difficult to be compensated. He is survived by large number of relative, friends and well wishers. We all pray that his soul may rest in peace in heaven.



OBITUARY

Born on 20th January 1911 in a zamindar family of district Moradabad. Th Bitta Singh was educated at SM College Chandausi. He subsequently went to Karanchi as an Inspection Officer to supervise exports of timber from undivided India. He was later posted to Bombay and worked there in the same department till 1948.

He moved to Sitapur in 1949 and joined the Sitapur Plywood Products as a Timber Procurement Officer.

In 1984 he moved to his farm and donated 20 beeghas of land and built a charitable school in his father's name. The school imparts free education to the poor and needy up to Class 10 and is affiliated to the U.P. Board.

He retired from active life in the year 2000 and settled down in Dehradun.

A member of the Wildlife Preservation Society of India when it was in it's formative years. Th. Bitta Singh had a keen interest in wildlife and forests. He was closely associated with most of his contemporaries in the U.P. Forest Dept.

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elephant

To Our Readers

With great pleasure our members are informed that we now have a website www.wpsidoon.org and our quarterly journal "Cheetal" can be accessed online by our members. This action was supposed to be taken much earlier but it is better late than never. This development coming in the 50th Volume of Cheetal, we can say this will be considered as a golden jubilee celebration for the Society. WPSI is the oldest society of North India dedicated to wildlife protection, being conceptualized in 1954. The journal of Society was started in 1959 with its first volume being circulated to its members in cyclostyled form. The journal has its rich background with articles from wildlife luminaries like EP Gee, George Shaller, Salim Ali, SR Chaudary, Arjun Singh, K.S. Shankhla, PD stracy, AJT Johnsingh & many others. Today we are facing a great crisis of lack of interest of our members. Very few quality articles are being contributed by our members. The journal can get a face lift by only informative articles with research inputs. Mr. Raza Kazmi a BE student from LNCT Bhopal, one of our young life members took special interest in last issue of Cheetal (Vol.50 No. 2) which was highly appreciated by many readers. We need inputs of that kind from all of you. The financial hurdle has been overcome by selling our old building and we can now afford better quality journal. The members can also suggest some other activities like visiting wildlife areas across the country, conducting national and international level workshops/seminars, developing material for school children, conducting debates, painting competitions and exhibitions in schools and organizing photography competitions for our members. All this is possible only when young & enthusiastic members take active part in organizing the activities. Any such help is totally absent at the moment and one or two members will be highly overburdened due to which there will always be a hesitation to go ahead. We can think of some research projects for which input of members will be highly appreciated.

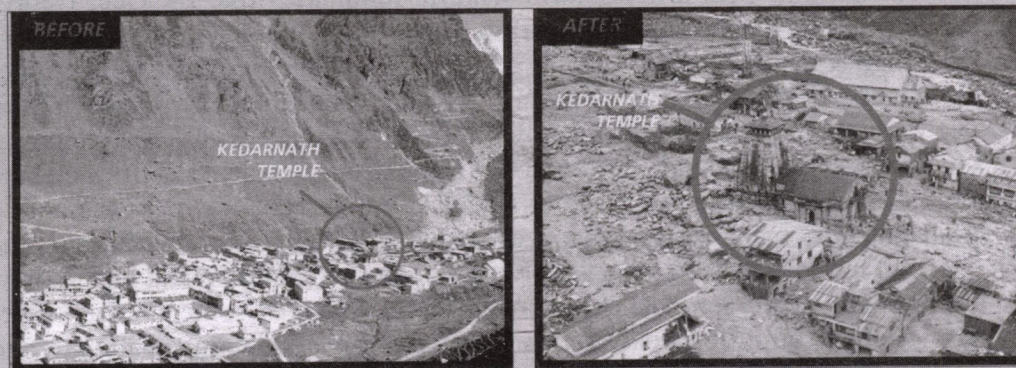
Members are also requested to suggest improvement in our web design & photographs for the same are welcome.

(A.S. Negi)

Editors comments

The following letter from Mr. Raizada to Honorable Minister of Environment and Forests, Govt. of India is a warning that came before the catastrophe that befell the tragedy at the holy shrine of Kedarnath on 16th June 2013 that was responsible for thousands of deaths and misery to scores of people not only locals but from all across the country. The tragedy washed away three towns completely and played havoc all along the banks of river Mandakani and Alakananda. The apprehension expressed by Mr. Raizada has only been expressed by the mother nature in a small measure just to warn what is there in store for us if we continue to ignore the ecological balance of the nature.

A.S.Negi



To,
Smt. Jayanti Natrajan
Hon'ble Minister of Environment and Forests,
Govt. of India,
New Delhi.

Subject: Plight of the mountains of India.

Hon'ble Madam.

Rapidly deteriorating environment is a matter of global concern, a premonition carrying warning towards the very existence and extinction of human race. In a country like India this is hovering more seriously, faced with a disproportionate graph of population growth and also preparing to deliver better living through modern development concepts — health; nourishment against malnutrition, education. Agriculture, horticulture and dairy advancements, communication, exploitation and use of natural resources, industrialization, hydro-electric and

other sector energy resource and many more means of 'progress' that need no description.

Survival of human race is at stake at the ends connected to these aspirations of progress. Efforts after efforts are on to attain safe environment but again this needs no evidence that nothing positive is appearing even after pouring in enormous financial, scientific, material and physical resources. Environment conscious nature lovers and scientists everywhere are concerned at the continually deteriorating soil, water and eco balance at the disturbed biotic relationship and bio diversity.

We in India have more to worry and must look at individually at the alarming recession of glaciers, sliding mountains and high rate of erosions, alarmingly polluted water bodies. These lines may run short to narrate the havoc and the imminent catastrophe that you are better aware of, but we are overlooking.

Mountains with their endemic vegetation had played a vital role in balancing environment and the life on this planet. The green and deserts have come to exist under their influence. Large parts of the earth (33%) are arid because they are devoid of mountains (Australia, Gobi, Sahara etc). India has been a green bowl by virtue of 96.6 million hectare mountain spread over the length and breadth in various description of the country, are only 19.4 % of the nation's land mass but contain 60% green and bestow 80% water to the bowl besides unlimited natural resources - minerals, organic matter, energy resource and many other to sustain the sub-continent's life and needs and yet we are bent upon spoiling the beautiful gift of nature to our land, India. Mountains below the Indo-gangetic plains, over the Indian plate, were geologically old and reached a stage of maturation of erosion and thus more stable whereas the Himalaya was a young earth mass in a process of establishing stabilization and thus more susceptible to damage. It needs no description what Himalaya has meant to this sub-continent through ages.

There was a sudden thrust of large scale incongruous planning connected to development and an additional burden of a process to deliver 'benefit to the plains of India which fell largely over the mountain chains in the form of hydro-electric & irrigation projects, transmission lines, roads for defense needs & others, forestry produce, agriculture/horticulture and medicinal herb exploits besides gathering and employing resource means to render benefit to the hitherto deprived ignorant masses of the mountains. Tourism parameters were expended employing more extravagantly newer definitions and avenues to create more and more employment generation opportunities, recreation and revenue from the limited available resource potential of a hitherto practice of recreation sojourn. This sector plan converted small bio-friendly habitations into metropolitan cities of modern definition facilities and over running old green cover, now radiating hot winds. The burden of this growth largely fell on the precious forest vegetation of all class and kinds especially some prime endemic species that nature had generated and established under specific geo-topographical conditions during ages to maintain bio environment relationships and bio-diversity of a place, besides conserving soil and strata.

The outcome of such development conceived planning and the persisting indifference exhibited towards the imminent ill-after-effects is vividly visible through rapidly rising high rate of erosion, landslides, increasing silt drainage in all rivers of mountains, warming environment and heavy incidence of cloudbursts, fast receding glaciers — a bad omen for Indian rivers to turn dry in the Coming times. The green cover is falling dangerously low. Most unfortunately

the replaced forestation has been with incompatible species to geo-nature of a place (such as Chir, Eucalyptus, Poplar, Rubinia etc.) that further aggravated the problem. A recent report predicts of a large part of Himachal Pradesh & Uttrakhand, covering nearly 233 villages, in a state of sinking.

Mountains of India, Himalaya in particular, under the circumstances, demand efforts of magnanimity and not an expression of concern but a meaningful practical work-plan that could restore natural grace and help restore environment. You are better aware of the enormity of the problem on environment and what this means to our existence but I have grown 75 years with the mountains — childhood with Aravali and Vindhya and the past 50 years with the loosing Himalaya and felt the pangs of this terrain more than anyone else and so also perceived, and conversant, with the remedies that this gracious system demands from us (Himalaya has peculiar geo-physical conditions of its own that are not being attended). Years together, and worldwide, as in India, no day is spared in expressing concern and spending millions in financial terms and means to repair the wrongs but without any outcome. This is more so with the mountains where deliberations and concern differ from deeds and action. Forgive me, but more so politically. The net result is before us.

We are deeply concerned, again globally, over the issue of global warming, running from Kyoto to Durban to settle issue of carbon emission and the responsibilities on emission rate. Mountains of India specifically are not a victim of evil of the sequences of carbon emission alone but innumerable other human introduced errors (a factor), inadvertently or knowingly cast, out of greed and incorrect perceptions. This is, regionally, greatly responsible of environment deterioration, glacial erosion and many other related calamities. We are frantic loud and no day is spared on expressing of imminent catastrophe but never sincere to repair. Planners are busy on ambitious 'Plans of growth', politicians in a race of extended applause gaining projections and we, in street, in a greed to live a sedate life, no matter where this leads.

Heart throbbing premonitions expressed by geo-scientists gathered at a symposium in London recently have rightly projected the folly of acts of a single species — man - in wroughting extinction of its own species, first time in 4.7 billion years of the life of this planet. This may appear trivial and a frivolous deliberation to propose a low profile deal to the development schemes in the mountain systems during this century of 'progressive living'. It rather calls for to define the burden of developments, nay the developments need programmed with the nature of the mountains along with means and methods in this part of our land in terms of (and in effect of) environment, bio-diversity and eco-balance besides outlets of deliverance as benefits for the plains of India. The methodology of delivering benefits and rendering economic growth to the deprived inhabitants of mountains (not the have-ones who intrude), in better eco-friendly ways, should be intelligibly introduced.

This is time to review development conceived objectives, pointed out earlier, that many a upland countries have either rejected or altered the phase of implementation /working to favour the mountain grace and the life sustaining environment.

Road construction network contributes to national growth in many ways and so also in mountains this is laid out to serve defense needs, passage to hydro-electric project installations, tourism growth, connect habitations (big and small), agricultural inputs, industrial expansions and many other Plan connected 'progress'. Roads have been the first task. But in these uplands,

especially the Himalaya, this has been the source to bring more perils. This extravaganza of overzealous road networking implemented recklessly and carelessly with unmanaged excavated debris on slopes, and other, has been affecting and generated land slides, affect weak strata, overrun the scarce green land (agricultural and precious forest) and tend to convert such green into large habitations and usual ecoproblems follow. I quote my part of Himalaya, at Katrain in Kullu hills of Himachal Pradesh where the National highway has been diverted thrice at the same location ever since it came into being without caring to the value of the scarce fertile green land and forest, the nature there and the ruin that shall follow. This activity drains down more debris into water bodies (but for political & bureaucratic influence/interest this could have been drawn far shorter, cheaper and without damaging the green. Such incidences are all over the uplands no matter what harm this brings). Late Babu Jagjeevan Ramji's apprehensions expressed at a conference of engineers during fifties that more silt is added into rivers of India on account of road constructions in mountains, has cane true and no engineer or planner has ever taken care of this rising menace. Example of Austria having restricted road (and train) passage cutting should be emulated.

Power projects —major, minor or macro — and the power lines lay-outs have similarly left large strata, forest and water course damaged, barren ad disturbed with no after-care (or repair, restoration and conservation). These projects in India have invariably resulted into on-site an uprooted topography.

Tourism:- tourism in various descriptions of holidaying, snow & mountain adventures, water related sports & recreation eco-tourism and others is the main stay of economy in mountain areas But efforts to overdo beyond resource parameters are the crux of the resultant problem — overdoing beyond capacity of an individual location. It is also leading into metropolitan class of habitation. Austria, Switzerland, Norway, New Zealand etc. attract more tourists but they have kept mountain beauty intact and grow nature friendly balanced tourism. Agriculture/horticulture was the basic living of people in these parts employing bio-organic means of culture. This sector is also taking shape of a major industry employing chemical medium to obtain larger produce that is sending out polluted flows into water bodies besides turning the soil texture and quality poor. Habitations :- Roads network, tourism, industrial growth and other means of 'Progress' have given rise to a trend of urbanizing mountain green belt all along road sides, a trend much different to the age old solitude habitation preferred in mountains. Organized builders who have no feeling of mountain grace and ethics but earning, usually under political patronage, have obtained the greenest fertile and already scarce cultivable land to convert into colonies (example is Kais locality in Kullu district of Himachal Pradesh and so also all over H.P. and Utrakhand and elsewhere in M.P. and southern hills). Every citizen has a right to settle down anywhere in the country but those not friendly to mountain eco-values but accustomed to a sedate life should not be encouraged to spoil mountain grace .The man of the hills is not deriving benefit from such habitations construction, the result is deterioration of eco balance

Water bodies: - All kinds of modern human activity in mountains have adversely influenced water bodies. Habitations close to water source add garbage, sewage disposals, excavations, depriving water banks of vegetative cover and thus interrupting biological cycle, Industrial pollution, agricultural pesticides and insecticides drainage and excavation of water

bed is another rising menace. Hydro-electric projects alter natural water course and in many cases this obstructs life form activity breaking the natural biocycle.

Forest: - Main victim of the above described ambitious development planning, under a cumulative effect, were the forest vegetation that in turn adversely influenced water resource/bodies and the land strata. Endemic vegetation that nature had evolved to balance moisture, environment and strata in these uplands under a specific geo-physical location, was ruthlessly removed. This generated a chain of negative eco-balancing process and the resultant catastrophe we are facing. Rise of alpha particles or anything is a result of loss of endemic vegetation. These lines are not enough to describe the whole mountain panorama of this sort but I quote my area of Himalayan wrongs. The endemic types viz. *Alnus*, *Quercus*, *Ulmus*, Chest-nut, Deodar etc and large number of brushwood such as *Principia*, *Berberis* etc. have been removed under various pretext during the last half a century. *Alnus* (Alder plant), a tree containing important Citrulline alkaline salt that made Himalayan soil fertile for millions of years (from Scandinavia, Alps and up to eastern edge of Himalaya and beyond) was inconsiderately felled for apple packing boxes in Kullu of Himachal and now reduced to a mere app. 3% of the past. Farmers in the bygone days had cared to maintain the cycle of this tree and conserved to their benefit. The harm, now, can be guessed.

Plight of the mountains began in the nineteenth century with the advent of foreign settlers exploiting forest commercially, timber or medicinal. Himalaya or the southern mountains irrespective conservation, of course, remained their administrative concern. The worst came in 1864/1884 when Chir plantation, an acidic behavior tree requiring acidic manure was introduced widespread. This left large tracts acidic and other consequential deterioration to this day. This was followed by other species such as eucalyptus, harmful to our environment. Past half a century has been the worst phase under our own working plans when various development schemes to render benefit to the plains of the country were introduced. Himachal alone has 2.82 lac hectare forest area of Chir plantation (other region may be having more) and the country has 17 million hectare under eucalyptus plantation. This plantation should be phased out early with endemic suitable plantation, especially Deodar, *Alnus* or such others.

Environment is not going to improve on mere expression of concern. Plan scheming over mountains is faulty. Our bureaucratic, political and now social attitude also has a world of difference in action and deed. I quote Himachal Pradesh where Land Tenancy Act, Road Control act and Country & Town Planning and such conservation Acts are reduced to redundancy and have become the laws of convenience which were framed and had the spirit to conserve nature and environment.

Mountains of India have been and shall ever be the hope resource, a time-guard factor of climate, locally. A great harm as been done to them during the past one and half century, -more so-during the past 60 years. We have to choose between survival and the fatal 'Progress' of recent terms. The former should receive precedence before the prophecy of doom of human species proves certain. We have already set in a process of deterioration, to leave a barren, eco-system for the future generation through our wrongs. This exposes our callousness, and persistence, of applying unethical programmes and ignoring the needed corrections. We talk

so much of global warming on account of green house gases or carbon emission but ignore other parallel activities working that are influencing and adding to our problems.

In the light of the aforesaid it is time to act and enforce to arrest a process of further damage to our mountain system and the consequential ills that generate :-

1. Development conceived plans, their purpose, efforts, application, utility and progression should remain under scrutiny of an independent nature conservation body consisting of subject matter experts/specialists.
2. Road expansion (including railway track) should be judiciously applied restricting use of green land and forest, slopes and excavated zone simultaneously conserved meticulously, slope cutting restricted.
3. Phasing out of environment and soil harming acidic nature plantation (Chit, eucalyptus etc.) and restoration of endemic plantation.
4. Stop converting mountains into metropolitan cities.
5. Protection of water sheds (river banks their beds and catchments) against any kind of human disturbance and pollution, in practice and not on files or words.
6. Conservation of all class of forests including waste land.
7. Methodology and means to deliver economic progress in mountains must be scrutinized.
8. Tourism expansion parameters and their progression should be scrutinized to allow a permissible pressure.

This task is connected to our survival and we may not perceive our faults now but the future generation that bears the brunt shall abuse us of apathy, our short sightedness.

Hon'ble Madam, I hope and expect you shall go through my submission in a sincere plane of thought and act positively.

Yours very Sincerely,

(S.B.Raizada)

(Member, Bombay Natural History Society)

P.O.Seobag, District Kullu. (Himachal Pradesh) -175138.

Copies to the Hon'ble Chief Ministers of the mountain states of the country with a fervent appeal to study my submission, submitted with an intention to save and salvage the mountains from further damage. It is important to measure the benefits of the present with safety of the future for the coming generation, safe living place that we leave:

1. Hon'ble Chief Minister, Himachal Pradesh, Shimla.
2. -Hon'ble-Chief- Minister. Jammu& Kashmir, Jammu,
3. Hon'ble Chief Minister, Uttarakhand, Dehradun.
4. Hon'ble Chief Minister, Sikkim, Gangtok.

5. Hon'ble Chief Minister, West Bengal, Kolkata.
6. Hon'ble Chief Minister, Arunachal Pradesh, Itanagar
7. Hon'ble Chief Minister, Assam, Dispur, Guwahati.
8. Hon'ble Nagaland, Kohima.
9. Hon'ble Chief Minister, Mizoram, Aizawl
10. Hon'ble Chief, Mizoram, Imphal.
11. Hon'ble Minister, Tripura, Agartala.
12. Hon'ble Minister, Jharkhand, Ranchi.
- Hon'ble Chief Minister, Chattisgarh, Raipur.
14. Hon'ble Chief Minister, Tamil Nadu, Chennai.
15. Hon'ble Chief Minister, Karnataka, Bangalore..
16. Hon'ble Minister, Kerala,
17. Hon'ble Chief Minister, Maharashtra, Mumbai.
18. Hon'ble Chief Minister, Madhya Pradesh, Bhopal.
19. Hon'ble Chief Minister, Rajasthan, Jaipur.
20. Hon'ble Chief Minister, Punjab, Chandigarh

(S.B. Raizada)

1. Copy to Honorary Secretary, Bombay Natural History Society, Hornbill House, Mumbai, with a request to make this letter appear, if feasible, in Hornbill for awareness on this carcinogen problem amongst people concerned on environment.
2. Copy to the Editor, The Tribune, Chandigarh, with a request to publish this letter to bring awareness in public, especially the mountaineers, about the dangers inherent in the kind of 'progresses' they are receiving.
3. Copy to the Editor, Divya Himachal, Dharamsala, to publish a Hindi version of the letter with a similar aim.

(S.B. Raizada)

Copy to the Hon. Secretary, Wildlife Preservation Society of India-Dehradun, for bringing this letter into the bulletin of the Society for a wider awareness amongst the people of the country who care for environment. I shall soon be sending my other papers on environment and pollution of environment and water.

Yours Sincerely,

(S.B. Raizada)
 RAIZADA NIWAS
 PO.- SEOBAG
 Distt. Kullu (H.P.) 175138

Letters to Editor

Dear Mr. Negi,
Aadab

Thanks for sending me a copy of June, 2012 issue of "Cheetal" Journal of the Wildlife Preservation Society of India, Dehradun. The Journal contains several interesting and useful articles. The cover pages, outside and inside photographs are excellent by Mr. Bhagat Singh, especially the inside one is very captivating and touching one. I would like to congratulate him and the board for their efforts and hard work for this Golden Jubilee issue.

While concluding my best wishes to the Editor and all concerned for their efforts for the success of the Journal.

Yours Sincerely,
(Dr. S. Farooq)
Add. – 321-D, Okhla Village,
New Delhi – 110025 (India)

EMAIL FROM MR. DIGMBAR GADGIL (dgadgil09@gmail.com) March 16, 2013

I consider April- July issue of Cheetal as the best so far I have seen since my membership. Congratulations, please keep it up to my age and ailments due to which it is impossible to visit sanctuaries described there in but the glimpses are wonderful for which writers specially lalthanhlua, Roheet, deserve thanks.

Digambar gadgil, nashik

EMAIL FROM MR. LALA A.K. SINGH (laksinghindia@gmail.com) June, 2012

Dear Dr. Negi

I have received the recent issue of Cheetal.

I have been a life member since 1975-76, and my opinion (I am happy about it) is that CHEETAL certainly continues to be a journal of a very different identity.

I will try to send some write-up at intervals.

Regards,

LAK Singh

Add. – Dr. Lala A.K. Singh

1830- Mahatab Road, Friends' Colony

Old town, Bhubaneswar

Pin – 751002, India

EMAIL FROM MR. Dr. Dushyant Singh Gaur (dugaur@yahoo.com)

Respected A.S.Negi Ji,

Many Thanks for the wonderful makeover of Cheetal magazine. I could not believe my eyes when I took it out of the envelope.

Heartiest Congratulations to you and the Editorial Team responsible for infusing a new life in the Cheetal, both in the looks as well as its content. I am glad and pleasantly surprised to know that Mr. Raza kazmi, who has been instrumental in bringing about these changes, is from my hometown, Bhopal. Please forward his e-mail to me as I would like to connect with him personally.

The articles in this issue are wonderful and pictures most amazing. They have made the journal more presentable. I loved reading about Dampa and 'How Tiger changed his coat' as well as about Valmiki and Umred- Kharhandla National Parks.

Also the article on Importance of Zoological parks by Mr. Vinod Rishi was great. I fully agree with his views.

I am sure with a leader like you, WPSI and Cheetal will attain more popularity, fulfilling its goal of wildlife conservation.

Sincerely,

Dr. Dushyant Singh Gaur MD

Professor of Pathology

Himalayan Institute of Medical Sciences,

Dehradun – 248140 UK

Socioeconomic considerations in conserving wetlands of northeastern India: A case study of Loktak Lake, Manipur

Devlin Leisangthem, Sangeeta Angom, Chongpi Tuboi, Ruchi Badola and Syed Ainul Hussain*

ABSTRACT

The Loktak Lake is the largest freshwater lake in northeastern India and is significant because of its hydrological and ecological services, and the socio-economic and cultural values that it represents. This study assesses the economic linkages between the Loktak Lake and the local people living around it, through socioeconomic surveys. The major objective of the study was to examine the educational and socioeconomic status of local people residing around the Lake and to determine their perceptions towards the benefits derived from it. Most of the respondents had been educated below X standard (85.7%). Only 5.6% respondents had studied up to XII standard followed by graduates (8.7%), and post graduates (0.9%) respectively. The main occupations of the people were fishing (92.2%) followed by services (9.96%), poultry (6.93%), skilled laborer (5.19%), business (2.60%), agriculture (1.30%), others (0.43%) respectively. The main threats faced by the Lake were reclamation (76.2%), pollution (51.5%), the construction of Ithai barrage (31.2%) and drainage system of the Lake (25.1%). The people in the region have high dependence on Loktak Lake; fishing is the most important direct benefit they are getting from the Lake and people favor intensive conservation measures for restoration of the lake ecosystem.

Keywords: Wetlands, ecological services, Loktak Lake, local communities, anthropogenic pressures, socioeconomic profile, conservation attitude, perception, Ramsar Convention

* Wildlife institute of India, P.O. Chandrabani, Dehradun

INTRODUCTION

The services provided by ecosystem and the natural capital stocks that produce them are critical to the functioning of earth's life-support system and thus contribute to human welfare, both directly and indirectly (Costanza *et al.*, 1998). The natural ecosystems not only provide life support services, but also services such as recreational and aesthetic values. In spite of such benefits, the natural ecosystems are showing a rapid declining trend worldwide. Wetlands are natural or manmade ecosystems and are defined as areas of land transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water (Cowardin *et al.*, 1979). *Wetlands deliver a wide range of ecosystem services that contribute to human well-being, such as fish and fiber, water supply, water purification, climate regulation, flood regulation, coastal protection, recreational opportunities and tourism (MEA, 2005).*

Wetlands are currently estimated to occupy around 8.6 million km² (6.4%) of the earth's land surface (Dugan & Maltby, 1975). However, in spite of various international agreements and national level policies, around 50% of the world's wetlands have been lost in the last century, primarily through drainage for agriculture and urban development and water system regulation. Other potentially damaging processes such as mining and effluent discharge are liable to have adverse effect on the wetland ecosystems (Shine & de Klemm, 1999).

The underlying causes of wetland loss have been recognized as incomplete information on their ecological services and functions, the high opportunity cost of their maintenance, the structural causes associated with who bears the costs and enjoys the benefits from their maintenance or conversion, and the lack of appropriate and recognized property rights (Adger & Luttrell, 2000). The multi-resource characteristic of wetlands influences the structure of resource-tenure and management regimes that often leads to conflicts. There is an urgent need to quantify and demonstrate the importance of wetlands at regional levels in order to stop further degradation, and to restore them where it is still possible (Filion, 1995). Moreover, there are inadequate social and economic mechanisms to encourage individuals to invest in maintaining ecosystem functions and services (Cork, 2002). Studies have indicated that although the conservation of wetlands may be influenced by larger policy decisions, their sustainable use relies mainly on farmers, fishermen and other users living close to wetlands (Pyrovetsi & Daoutopoulos, 1997; Sah & Heinen, 2001; Badola *et al.*, 2012). Therefore any conservation initiative in wetlands should address the socio-economic condition of the local people as well as develop their stakes in conservation of the wetland. Successful management of wetlands can only be accomplished by continuous participation and involvement of local people and other stakeholders and by developing sustainable livelihoods for the local people by

building on the resources already present in the villages (Tomićević *et al.*, 2010).

The northeastern states of India harbor some of the spectacular and biologically rich wetlands of India. With increasing human pressure, infrastructure development and prevalent underlying causes, these wetlands are under threat (Trisal & Manihar, 2004). Recognizing the implications of many of the above factors, we assessed the economic linkages between the Loktak Lake and the local people living around it, through socioeconomic surveys. The major objective of the study was to examine the socioeconomic status of local people residing around the Loktak Lake and to determine their perceptions towards the ecosystem benefits derived from the Lake. The study on the perception and attitude of the stakeholders or the local communities helps in knowing the understanding of local people about the ecosystem, their values and the problems, issues and threats. In Indian scenario however this is rarely examined while planning conservation.

Study Area

Loktak Lake situated at 24°25' – 24°42' N latitude and 93°46' – 93°55' E longitude is the largest natural freshwater lake in northeastern India having an area of 287 km² (Figure 1). The Loktak Lake was designated as a wetland of international importance under the Ramsar Convention on March 23, 1990. The characteristic feature of this Lake is the presence of floating biomass locally called as *Phumdi*. The area and

thickness of the *phumdi* varies from very thin 0.5 m to 7.0 m. They are heterogeneous masses of soil, vegetation and organic matter in various stages of decomposition. They float on the Lake with about one-fifth of their thickness above water and the rest below the surface. The depth of the Lake varies from 0.5 to 4.58 m, with an average depth recorded at 2.7 m (Singh, 1992).

The Loktak Lake comprises several smaller lakes or *pats*. Until 1983, the area used to experience large water level changes during the year, so that several lakes were separated during the low water phase (65 km² at 765m above msl) and merged into one lake, only at the time of high flood (495 km² at 780 m above msl). Since the commissioning of Ithai Barrage in 1983, it has been converted into a permanently flooded Lake with relatively small water level changes regulated by the withdrawal of water for hydroelectric project (Trisal & Manihar, 2004).

The largest floating island of the Loktak Lake is Keibul Lamjao National Park (KLNP), the home of the endangered Eld's deer (*Rucervus eldii eldii*). It is also a unique wintering ground for various migratory waterfowls and permanent home to many resident waterfowls (Singh, 1992; Trisal & Manihar, 2004). The KLNP located in the southern fringe of the Lake is a unique floating wildlife reserve. The Lake is also the breeding ground of a number of riverine fishes and continues to be a vital fisheries resource. The Lake plays an important role in providing ecological and economic security

to the region. A large population living in and around the Lake depends upon its resources for their sustenance.

Description of villages

There are 40 villages located around the Loktak Lake most of them having fishing as their main occupation (Figure 1). The villages around the Lake mainly fall under three out of the nine districts of Manipur, Bishnupur, Thoubal and Imphal West district. Around 15% of the valley population

is concentrated around the Loktak Lake alone. On the basis of place of settlement, the lake dwellers are known as, the lakeshore communities, the island communities (who live on the islands) and the phum dwellers *khangpok* (who live either permanently or temporarily on the phumdis by making small huts). These communities depend on the Lake resources directly or indirectly for sustenance (LDA, 2011).

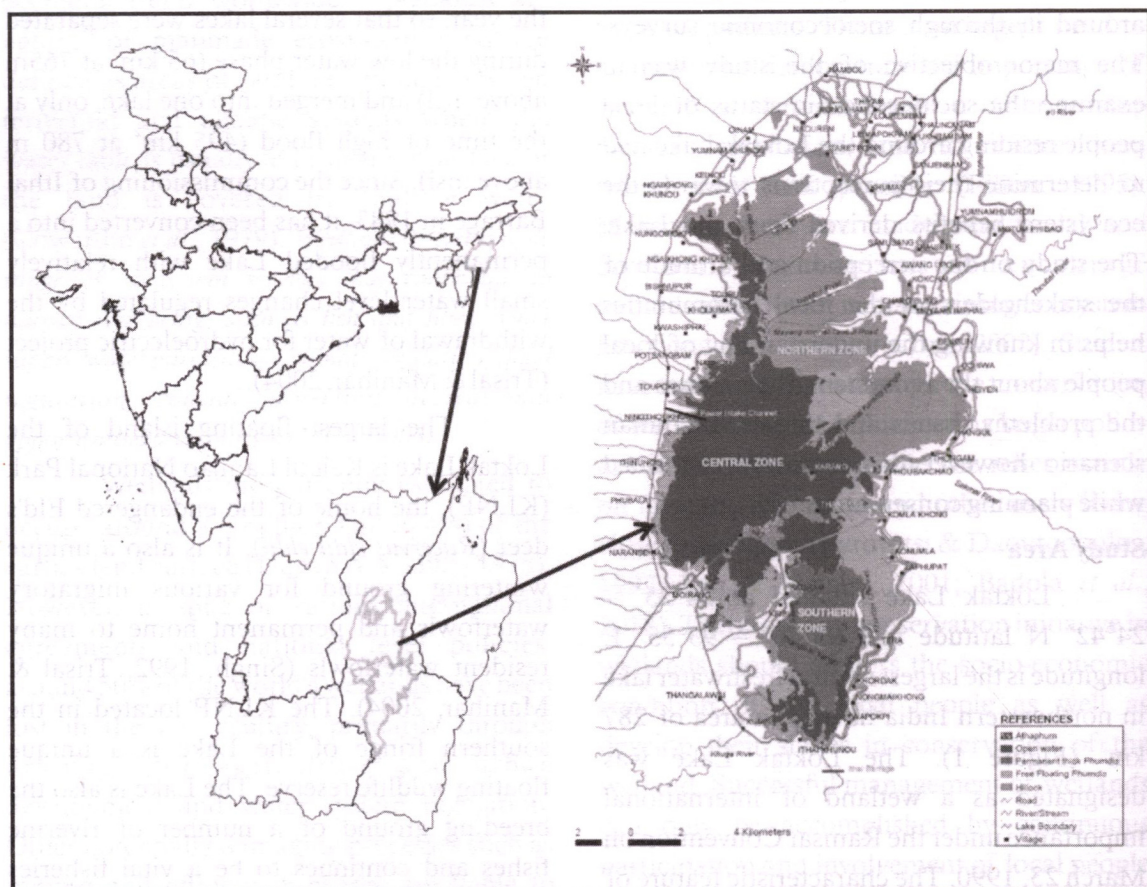


Figure 1. Location map of Loktak Lake, Manipur, India.

METHODS

The study was conducted in the 14 villages surrounding the Loktak Lake, 7 villages in north, 5 villages in west, 1 village in south and 1 village in east, to examine the educational status, occupation and household income from all sources as well as the awareness and attitudes of the local people regarding the ecosystem services provided by the Lake. The study was carried out with the help of a questionnaire survey in 231 households during February to August 2008.

Data were also collected regarding the average yield, fertilizer use and ground water depth in the areas adjoining the Lake. For the evaluation of resource dependency, the local markets near the Lake were monitored. Baseline information on the plant species used by local people for various purposes, seasonal use and mode/area of extraction was collected through questionnaire survey and direct observations. Interview was conducted to gather information about the collection of firewood, methods of collection, various uses and average quantity extracted. The data collected was studied to make comparison between the different groups of people in terms of their socio-economic characteristics and attitudes towards environment/ecological services in the Loktak Lake.

For assessing the indirect/direct benefits that the local people derive from the Lake and services provided by the Lake, their dependence and the anthropogenic pressure on the Lake, their view regarding provisions of ecosystem services, household surveys

were carried out in the 4 different zones covering 14 villages at close proximity to the Loktak Lake. Questions were also asked to determine the major threats affecting the integrity of the Lake as perceived by local people. The approach was to make the respondents aware about the various threats to the Loktak Lake such as reclamation, impact of Ithai barrage, drainage, and pollution through an attitude questionnaire.

Data analysis

Data were analyzed on the basis of education, occupation, household income, benefits and harm, direct/indirect benefits derived from Lake and threats face by Lake. Simple statistics were used in analysis and interpretation of the data. Various descriptive statistics like frequency, percentage and mean were used to make the comparison. The data was analyzed using statistical MS Excel Data Analysis tool for **making tabulation and calculation**. SPSS (Statistical Package for Social Sciences) is used for data analysis wherever necessary.

Results

Socioeconomic status of local communities on Loktak Lake

The main workers constitute 38.6% of population of the state and marginal workers 3.63%, while the non workers constitute 57.8% of the state population. The overall educational percentage shows maximum of the respondents below X standard (85.7%), graduate 8.7%, XII standard 5.6% and post graduate 0.9% while none of the respondents

were PhD, diploma course, engineer and doctor (Table 1).

Table 1. Educational status of local people in four different zones of the Loktak Lake, Manipur.

Educational status	Northern		Western		Eastern		Southern		Overall	
	N	%	N	%	N	%	N	%	N	%
Below X grade	94	84.7	69	88.5	15	71.4	20	95.2	198	85.7
Graduate	14	12.6	3	3.9	2	9.6	1	4.8	20	8.7
XII grade	4	3.60	6	7.7	3	14.3	0	0	13	5.6
Post graduate	1	0.90	0	0	1	4.8	0	0	2	0.9

(N= total number of different classes of educational status in each zone)

Fishing was the main occupation of the people with 97.4%, 95.2%, 90.9% and 76.2% in the western, southern, northern and eastern zone respectively. Fishing was followed by services with maximum percentage of 28.6% in the eastern zone, 14.3%, 8.1% and 6.4% in the southern, northern and western zone respectively. Around 9.0% and 7.7% of the respondents in the northern and western zone were engaged in poultry farming which was and not observed in the eastern and southern zone. Highest number of people engaged in agriculture (9.5%) was observed in the

southern zone followed by 0.90% in the northern zone and was not observed in the western and eastern zone. Except for the western zone, the respondents in the eastern, southern and northern zone had business as their main occupation (4.7%, 4.7% and 3.6% respectively). The overall occupational status of the people revealed fishing (92.2%) as the main occupation followed by services (9.9%), poultry (6.9%), skilled laborer (5.2%), business (2.6%), agriculture (1.3%) and others (0.4%) respectively (Table 2). Table 2. Occupational status of local people in 4 different zones of the Loktak Lake, Manipur.

Occupational status	Northern		Western		Eastern		Southern		Overall	
	N	%	N	%	N	%	N	%	N	%
Fishing	101	90.9	76	97.4	16	76.2	20	95.2	213	92.2
Agriculture	1	0.9	0	0	0	0	2	9.52	3	1.3
Skill laborer	8	7.2	2	2.6	2	9.5	0	0	12	5.2
Poultry	10	9.0	6	7.7	0	0	0	0	16	6.9
Services	9	8.1	5	6.4	6	28.6	3	14.3	23	9.9
Business	4	3.6	0	0	1	4.7	1	4.7	6	2.6
Others	1	0.9	0	0	0	0	0	0	1	0.4

(N= total number of different categories of occupation in each zone)

The monthly income of maximum of the respondents was observed to be below Rs 8,000 98.7%, 95.2%, 91.9% and 71.4% in the western, southern, northern and eastern zones respectively. The overall percentage of respondents with income between Rs 8,000

and Rs 16,000 was 6.1%. Only 0.9% of the respondents had monthly income between Rs 16,000 and Rs 25,000. None of the respondents in all the four zones had a monthly income higher than Rs 25,000 (Table 3).

Table 3. Family income of local people in 4 different zones of the Loktak Lake, Manipur.

Family income/month	Northern		Western		Eastern		Southern		Overall	
	N	%	N	%	N	%	N	%	N	%
<Rs.8,000	102	91.9	77	98.7	15	71.4	20	95.2	214	93%
Rs.8,000 - 16,000	7	6.30	1	1.28	5	19.1	1	4.76	14	6.1
Rs.16,000 -25,000	1	0.90	0	0	1	0.05	0	0	2	0.9
Rs.25,000 - 40,000	0	0	0	0	0	0	0	0	0	0
>Rs.40,000	0	0	0	0	0	0	0	0	0	0

(N= total number of monthly family income of each zone)

Dependence of the local communities on Loktak Lake

In all the four zones, 100% of the respondents gave fishing as the most important benefit they are getting from the Lake followed by drinking water as an important benefit with an overall 4.8%. In western and southern zones none of the respondents gave drinking water as a benefit which indicates that the people in this zone are not dependent on the Lake for drinking water. This may be due to the fact that maximum influx of pollutants into the Lake

is through the western zone and the southern zone of the Lake is the Keibul Lamjao National Park (Figure 2).

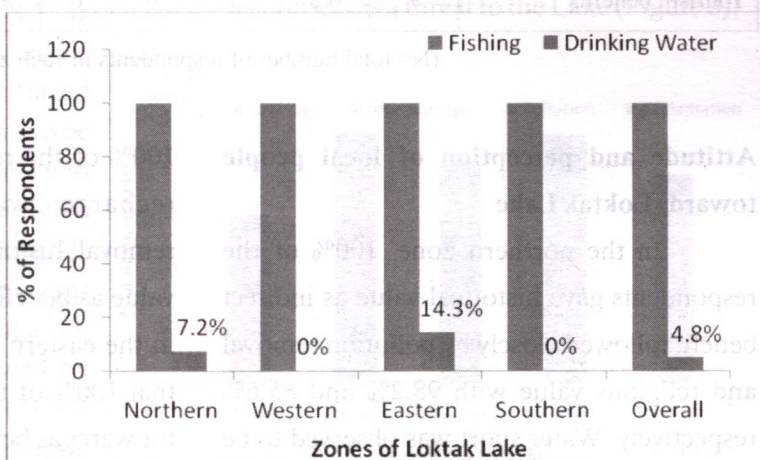


Figure 2. Important benefits derived by local people living around the Loktak Lake, Manipur (N=231)

Collection of vegetables and tall reeds as thatching material was stated as the next important benefit from the Lake, in all the four zones with an overall percentage of 93.1% and 62.2% respectively. The eastern zone seems to depend largely on the Lake for water for domestic purposes (71.4%). The overall percentage of respondents depending on the Lake for water for domestic purposes was 22.1% in all the 4 zones. The overall

percentage for tourism benefits and water for irrigation in all the four zones was 3.46% and 3.03% respectively. Fodder for cattle and fish farms seems to be the least important benefit with an overall percentage of 0.43%. This may be due to the reason that cattle are allowed to graze freely within the Lake area and fishing is done directly in the Park so very few fish farms are there (Table 4).

Table 4. Dependence of the local people on the Loktak Lake, Manipur.

Direct benefits	Northern		Western		Eastern		Southern		Overall	
	N	%	N	%	N	%	N	%	N	%
Wild vegetable	103	92.8	77	98.7	18	85.7	17	80.9	215	93.1
Thatch materials	55	49.6	74	94.9	9	42.9	15	71.4	153	62.2
Water for irrigation	5	4.5	0	0	1	4.8	1	4.76	7	3.03
Water for domestic use	19	17.1	27	34.6	15	71.4	0	0	51	22.1
Fodder for cattle and fish farm	1	0.9	0	0	0	0	0	0	1	0.43
Tourism benefits	7	6.3	0	0	0	0	1	4.76	8	3.46

(N= total number of respondents in each zone)

Attitude and perception of local people towards Loktak Lake

In the northern zone, 100% of the respondents gave historical value as indirect benefit followed closely by pollution removal and religious value with 98.2% and 85.6% respectively. Water sport was observed to be the least important benefit derived from the Lake with only 11.7%. In southern villages,

100% of the respondents gave ground water recharge, waste procession, pollution removal, historical, religious and recreational value as benefits. Similar result was observed in the eastern zone. The only difference was that 100% of the respondents gave provision for water as benefit in the eastern zone. In the western zone, 100% of the respondents gave pollution removal, religious, historical and

recreational value as benefits followed closely by ground water recharge (82.05%), provision for water (34.6%) and aesthetic value (1.20%). The overall benefits, in all the four zones were observed to be pollution

removal (99.1%). followed by religious values (93.1%) and sports (5.7%). No benefit from silt trapping was observed in all the four zones (Table 5).

Table 5. The ecosystem services derived from the Loktak Lake, Manipur

Benefits	Northern		Southern		Eastern		Western		Overall	
	N	%	N	%	N	%	N	%	N	%
Provision of water	19	17.1	0	0	21	100	27	34.6	67	29.0
Ground water recharge	71	63.9	21	100	21	100	64	82.1	177	76.6
Silt trapping	0	0	0	0	0	0	0	0	0	0
Pollution removal	109	98.2	21	100	21	100	78	100	229	99.1
Recreational value	47	42.3	21	100	21	100	78	100	167	72.3
Aesthetic Value	31	27.9	0	0	0	0	1	1.20	32	13.9
Historical	111	100	21	100	21	100	78	100	231	100
Religious	95	85.6	21	100	21	100	78	100	215	93.1
Sports	13	11.7	0	0	0	0	0	0	13	5.7

(N= total number of respondents in each zone)

Threats faced by the Loktak Lake

Maximum (76.2%) of the respondents in all the 4 zones gave reclamation as the main threat faced by the Lake. Western zone seems to be most affected by reclamation with 98.7% responses, followed closely by southern and eastern zone with 80.9% responses each. Northern zone seems to be least affected by reclamation with (58.6%). This was followed by pollution in all the 4 zones (51.5% responses). Next the respondents gave the construction of Ithai barrage as the threat face by the Lake (31.2% responses) and

lastly the drainage system of the Lake (25.1% responses) as a threat to the Lake (Figure 3).

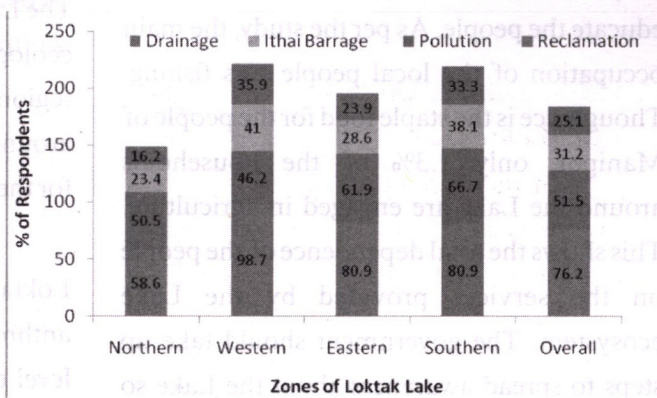


Figure 3. Major threats faced by the Loktak Lake, Manipur (N= 176)

DISCUSSION

Loktak Lake is one of the largest fresh water lakes in the northeastern India which is under siege due to anthropogenic pressures. **This is largely because** the services provided by wetlands have often been undervalued (Turner *et al.*, 2000). Many studies have emphasized that the attitude of local people is one of the ultimate factors determining the improved management and conservation effectiveness of the protected areas (Struhsaker *et al.*, 2005). There is a need to improve the strategies that address this aspect so that human attitudes, value systems and behavior can be influenced to the benefit of this wetland (Ambastha *et al.*, 2007; Badola *et al.*, 2012).

The people living around the Lake are not highly educated. The Government should take actions to remedy the situation and provide the necessary requirements to educate the people. As per the study, the main occupation of the local people was fishing. Though rice is the staple food for the people of Manipur, only 1.3% of the households around the Lake are engaged in agriculture. This shows the total dependence of the people on the services provided by the Lake ecosystem. The government should take up steps to spread awareness about the Lake so that the local people can continue to use the

services provided by the Lake without harming the Lake in the process. The study has given valuable information about the use of Lake, and its environment, culture, and most important of all, the extent of dependence of the local people on the Lake and the impact of their dependence on the Lake. Even though maximum income comes from the services provided by the Lake ecosystem, monthly income for maximum of the household is very low. This low income generation may be the main reason behind the low literacy rate of the local people around the Lake.

An important conclusion of this study is that the construction of Ithai Barrage, a multipurpose project in 1983 for generation of hydel - power and irrigation which was commissioned at Ithai at the southern nearest tip of Loktak, has brought about drastic hydrological changes in the Lake ecosystem. The Lake plays an important role in providing ecological and economic security to the region. A large population living in and around the Lake depends upon its resources for their sustenance.

At the surface it may appear that the Loktak Lake is facing major threat due to high anthropogenic pressure, however at a deeper level the Lake is being destroyed because of reclamation, maximum influx of pollutants

like discharge of agricultural pesticides, insecticide, domestic wastes into the Lake, prolific growth of floating weed mats.

In addition to the above threats, encroachments through construction of fishponds, roads and settlements have gradually led to degradation of the lake ecosystem. This has brought about drastic changes in hydrological regimes and converted a natural wetland with fluctuating water level into a reservoir with more or less constant water level. This led to inclusion of Loktak Lake in the 'Montreux Record' by Ramsar Convention which highlights the priority attention to be accorded to restoration of the lake ecosystem. The root cause problems of the Loktak Lake can be traced to loss of vegetal cover in the catchment area and construction of barrages in the upstream and particularly Ithai Barrage in the southern part of the lake. The degradation of the catchment area has led to the problems of siltation and increased inflow

of nutrients (Trisal & Manihar, 2004).

The present study provides information about people's impressions and opinions that might be useful in targeting education and public awareness programs or in shaping policy (Streever *et al.*, 1998). It provides an opportunity to highlight the importance of these wetlands to the livelihoods of the local people and the urgent need to sustain these through diversification and strengthening the resource base.

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REFERENCES

- Adger, W. N & C. Luttrell. (2000). Property rights and utilization of wetlands. *Ecological Economics*. 35: 75-89.
- Ambastha, K., S. A Hussain, & R. Badola. (2007). Resource dependence and attitudes of local people toward conservation of Kabartal wetland: a case study from the Indo-Gangetic plains. *Wetlands Ecology and Management*. 15(4): 287-302.
- Badola, R., S. Barthwal-Chandola, & S.A. Hussain. (2012). Attitudes of local communities towards conservation of mangrove forests: A case study from the east coast of India. *Estuarine, Coastal and Shelf Science*. 96: 188-196.
- Cork, S. (2002). Ecosystems services: The many ways in which biodiversity sustains and fulfills human life.
- Costanza, R., R. d' Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R. V. O'Neill, J. Paruelo, R. G. Raskin, P. Sutton, & M. van Bel. (1998). The value of the world's ecosystem services and natural capital. *Ecological Economics*. 25(1): 3-15.
- Cowardin, L. M., V. Carter, F. C. Golet & E.T. La Roe. (1979). Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, Washington, DC.
- Dugan, P.J. & E. Maltby. (1995). Protected Areas and the Hydrological Cycle in Expanding Partnerships in Conservation. Island Press and IUCN-The World Conservation Union,
- Fiallo, E. A & S. K. Jacobson. (1995). Local communicates and protected areas; Attitude of rural residents towards conservation and Machalilla National Park, Ecuador. *Environmental Conservation*. 23:151-156.
- LDA. (2011). Annual Administrative Report 2010-2011. Loktak Development Authority. A Government of Manipur undertaking. Manipur, India.
- MEA. (2005). Ecosystems and human well-being: wetlands and water synthesis: a report of the Millennium Ecosystem Assessment. Millenium Ecosystem Services. World Resources Institute, Washington, DC.
- Pyrovetsi, M., & G. Daoutopoulos. (1999). Farmer's needs for nature conservation education in, Greece. *Journal of Environmental Management*. 56, 147-157.

Richardson, C. J . (1994). Ecological functions and human values in wetlands. *Wetlands*. 14: 1-9.

Sah, J. P & J. T Heinen. (2001). Wetland resource use and conservation attitudes among indigenous and migrant peoples in Ghodaghodi Lake area, Nepal. *Environmental Conservation* 28, 345-356.

Shine, C & C. de Klemm. (1999). Wetlands, Water and the Law. Using law to advance wetland conservation and wise use. IUCN, Gland, Switzerland, Cambridge, UK and Bonn, Germany. Xvi. 330 pp.

Singh, T. (1992) Population and habitat viability. In: Walker, S. (Ed.), Assessment Workshop: Briefing Book on Sangai. , CBSG, India, Mysore.

Streever, W. J., M. Callaghan-Perry, A. Searles, T. Stevens & P. Svoboda. (1998). Public attitudes and values for wetland conservation in New South Wales, Australia. *Journal of Environmental Management* 54: 1-14.

Struhsaker, T. T., P. J. Struhsaker & K. S Siex. (2005). Conserving Africa's rain forests: problems in protected areas and possible solutions. *Biological Conservation* 123:45-54.

Tomićević, J, M. A. Shannon & M. Milovanović. (2010). Socio-economic impacts on the attitudes towards conservation of natural resources: Case study from Serbia. *Forest Policy and Economics* 12(3): 157-162.

Trisal, C. L. & Th. Manihar (eds). (2004). Loktak: The Atlas of Loktak Lake. Wetlands International and Loktak Development Authority: New Dehli and Imphal.

Turner, R. K., J. C. J. M. van den Bergh, T. Soderqvist, A. Barendregt, J. van der Straaten, E. Maltby & E. C. van Ierland. (2000). Ecological-Economic Analysis of Wetlands: Scientific Integration for Management and Policy. *Ecological Economics* 35: 7-23.

MAN-EATERS AND WILDLIFE CONSERVATION

Vinod Rishi



Direct and violent confrontations between wild animals and human beings are becoming a serious problem in the pursuit of wildlife conservation in modern times. According to the Status Paper of Uttarakhand Wildlife Conservation Organization, 2011, in the first decade of this century 558 people were attacked by leopards, and 555 leopards were found dead. The figures for tigers were 41 and 51 respectively. Out of these 89 leopards were declared as man-eaters and 44 shot dead or captured. In the case of tigers, 4 were declared man-eaters and one was

captured. The balance number of leopards and tigers were ascribed different reasons for their deaths.

The number of leopards declared man-eaters is abnormally high when we recall that Jim Corbett could find in his entire life-time only two man-eating leopards – one at Rudraprayag and the other at Panar – in the Uttarakhand hills, and that too at a time – a century before – when the number of leopards was many times more than today in the same region. A century old case of the man-eating

*Aranya Ashram Chndrabani Grant, P.O. Mohobewal, Dehradun

leopard of Rudraprayag appears to have spread the notion among the people and the media of the State that all leopards are potential man-eaters. Consequently, it is difficult to argue whether all were actually man-eaters or accidental attackers.

Jim Corbett was a gifted conservationist. He had the desire and skill to identify man-eating tigers and leopards, and he did it by examining pugmarks and trails of the suspected animal, a skill that our people, by and large, today lack. Any attack on human beings is treated as the work of a man-eater, and trigger happy people come forward to kill them without properly identifying the attacker. Accidental attacks by a mother in the defense of her young, or a cornered wild animal trying to escape from human cordon are not repeated. But at the death of any animal of the species the people think a man-eater has been eliminated successfully by the hunters. This is one act that goes against the principles of wildlife conservation.

In the early 1980s the reports of man-eating tigers in the Terai sugarcane fields of Uttar Pradesh had taken alarming proportions. The people wanted to know how many human deaths are required before the forest department declares the animal a man-eater to be shot dead? The problem from the point of view of the forest officers was (i) which animal out of so many living in the area attacked the human being? And (ii) did the incident qualify to be recognized as an accident or a deliberate attack on a human being? The delay in decisions made people impatient. People wanted quick action, and

the hesitation on the part of the forest department personnel was resented by the people.

One such incident of man-killing happened inside Dudhwa National Park in 1982. The author of this article was then camping at Sonaripur inside the National Park. The situation was taken up to try and find solutions to such critical questions.

SONARIPUR

Dudhwa National Park and Tiger Reserve is located in a remnant wildlife habitat in the Terai region of Uttar Pradesh. It abuts the Indo-Nepal international boundary. The conservation area is an extensive mosaic of grass-lands, locally called 'phanta', interspersed with sal (*Shorea robusta*) forests and patches of other associated woodlands. The water-table is high; and the grasslands get water-logged during the rainy season. The soil is clayey, and it becomes very hard during the dry season. When the ground is dry, vehicular movement over fair-weather roads creates a fine layer of dust on the road surfaces. Such a surface registers impressions of anything that moves over them – even the pugmarks of tigers, leopards, bears and deer.

Ten kilometers inside the forest, eastward from the main gate of the National Park on Palia-Dhangarhi road, is Sonaripur, the headquarters of a Forest Range of the same name. In April 1982, it was a small complex of buildings that housed offices, residential staff quarters and a forest rest house for touring officers. About six kilometers south-westward of it is Salukapur,

another forest hamlet linked to it by a jeepable forest road. Fair-weather forest roads linked Sonaripur and Salukapur with Dudhwa.

Sonaripur could also be reached by rail from Dudhwa. It boasted of a Railway Station, a kilometer and a quarter to its north-west, on the Dudhwa-Belrayan line. The road from Sonaripur to the Railway Station crossed the railway line and carried on toward a Tharu Village, a few kilometers away in the north.

Sonaripur had extensive grasslands stretched out from it in the east, north-east and north-western directions, and dense sal forest and tree plantations in its south-east, south, south west, and western sides.

I had arrived from Dehradun at the forest rest house on 13 April 1982 to organize and conduct a two week refresher course on wildlife management for senior forest officers from different State Forest Departments of India. I was getting my luggage down from my jeep when I heard alarm calls of peafowl and spotted deer coming from the direction from which I had arrived. Their calls meant only one thing: there was a leopard or a tiger in their sight. The afternoon sun was at its peak. I felt it was rather early for a big cat to put in an appearance so close to a human habitation. I went out and sat up on a flight of steps behind the rest house to watch for the developments.

An elephant proof trench had been dug along the boundary of the Range Compound after a herd of 36 elephants had entered Dudhwa National Park from Nepal in the

north, where forest had been cleared by agriculture settlers. The earth from the dug up trench had been piled up on the outer side of the trench. It had formed a kind of low ridge that ran all along the outer edge of the trench. As I waited in the scorching sun, I saw a couple of spotted deer in a stand of teak trees beyond the trench, staring intently toward a bush near the earthen ridge. A few minutes later a large tiger stepped out of the bush and casually start walking along the ridge in the direction of the Range compound. He paid no attention to the human presence and frenzied barking of dogs. Surprised at the air of indifference toward human presence and barking dogs, and the time of the day the tiger came out in open at the edge of a human habitation, I made a note of his unusual behavior in the Rest House register.

TIGER ATTACK AT SONARIPUR

A few days later, in the late afternoon of 18 April 1982, while I was discussing the progress of the training program with the Director of the Wildlife Training Institute



over a cup of tea outside the Rest House, we were distracted by shouts and a commotion at the north-eastern end of the hamlet. I thought people were trying to drive away wild elephants, but the Rest House staff told us that a tiger had just now carried off Uma Shankar, a Forest Guard of Sonaripur Range, who was also a Wireless Operator for the Range, and they were going away to rescue him. It was getting dark. A team of armed forest staff, led by V.N. Singh, the Range Officer of Sonaripur, went out on a tractor into the eastern phanta, into which the tiger had disappeared with its human victim. The search party returned late at night, unsuccessful in their search.

THE INVESTIGATION

Early next morning I, accompanied by the Range Officer of Sonaripur and a few members of staff, started our investigation into the tiger attack on Uma Shankar. We had little hope of finding the Forest Guard alive, but we started our search from the spot where he had been attacked by the tiger.

The staff quarters where the Forest Guard lived with his young wife and their child did not have a toilet; they used the forest across the trench for the purpose. A pair of wooden planks thrown across the elephant proof trench near his quarters served as a bridge over the trench. On the fateful evening, Uma Shankar and a fellow staff member were headed for the forest on the far side of the trench to answer the call of nature. The dusk had fallen, and the spaces under the tall bushes and grasses that grew on the earthen ridge, just a few feet from the end of the make-

shift bridge, were filled with gloom.

Uma was in the lead. His friend, who was still on the bridge, saw Uma reach the grass cover and stoop down to sit in it. A moment later he heard Uma's cries of distress. There was a fierce growl and a violent struggle in the bushes. Hearing Uma's cries, his friend turned back and ran to the Range Office to get help. The Range staff returned quickly with fire arms, but could not help Uma.

We reached the spot by the wooden bridge. The ground under the bushes where the struggle had taken place was disturbed. A brass urn (lota) lay on it, its water unspilt. One of Uma Shankar's rubber slippers lay by its side. But the soil on the ground had been completely trampled down by the numerous feet of the search party. Nowhere could I find the pugmarks or the trail of the tiger which could help me in recording some identifying feature for comparison in future.

A little farther, a dried up pool of blood stained the ground on the old cart track. It was here the tiger had released his grip on Uma Kant's neck, and blood had spurted out of the punctures made by his canines. The tiger had then shifted his grip to balance and carry the dead body, and entered into the tall grass that lined the far side of the cart track. The grass blades and stalks on either side of his trail in the grass were smeared with blood at a height of about a foot and a half from the ground. A few steps further Uma Kant's blue underwear had come off and was snagged in the grass, its knot untied. The untied knot indicated that he had had no time to settle down to answer the

call of nature. Thereafter, spots of blood could be seen on the grass blades and leaves of bushes along the parting in tall grasses through which the tiger had moved on with his victim. We now needed a riding elephant to proceed further into the tall grass cover.

We searched the phanta grassland on an elephant, and came across a blood soaked vest and a few splinters of bone at a spot about two hundred meters east of Sonaripur Range Compound. Further search had to be aborted because a strong hail storm hit the area. The pitiful remains and the blood soaked vest were carried back to the Range Office.

THE RIDDLE OF THREE TIGERS

With nothing with me to establish the identity of the tiger that had attacked Uma Shankar, I decided to look for tiger tracks at the waterhole near the Range Compound. I was sure the tiger must have gone for a drink at the nearest waterhole after having fed on human flesh. Water was sparsely available at that time of the year. The next water hole to the one near the Rest House was at Bankey Taal, six kilometers west of Sonaripur. The chances of a tiger walking 6 kilometers from where he had had his meal for quenching his after-meals thirst were lower than of his visiting the water-hole 200 meters away near the Rest House in the dead of night. I suspected the tiger I had seen on the 13 April 1982 was the culprit; because his boldness made me think that he would not care if the Rest House was occupied by human beings. Therefore, I decided to visit the nearer water-hole to check for the pugmarks of the killer.

But I was in for a big surprise. That night three tigers had visited the water-hole near the Rest House! One, a male just reached adulthood, had walked down the road from Sonaripur Railway Station to the gate of the Range Compound, turned west to slake his thirst at the waterhole, and returned the way he had come. Another one, a female, adult, had walked down to the waterhole from a jeep track in the western phanta, turned south after drinking water, crossed the road from Dudhwa behind the Rest House, and proceeded down a fire-line that headed south toward Salukapur. The third tiger, a large adult male, had come up an old cart-track on which we had found the blood stains, crossed the Station road near the northern gate of the Range Compound, and reached the waterhole. He then skirted the Range Compound, reached Sonaripur-Salukapur Road and entered the eastern phanta at a point about fifty meters down from the southern check gate of the Range Compound. So, which one was the attacker?

The first human kill had taken place in the direction from which the younger male had arrived. The second kill had taken place in the direction from which the larger tiger came. And it might just be a coincidence that the tigress had taken a round walk to reach the waterhole. The waterhole had created a riddle for me to solve.

From the soft, loamy soil around the waterhole, and the thin dusty roads the tigers had walked, I picked up the pugmarks and other details of their trails. I labeled the two male tigers: the smaller one that had come

down the Station Road as Tiger A, and the one from the eastern phanta as Tiger B. The tigress was not labeled for the time being, and as it turned out eventually, there were no other tigresses in the area.

PROBING THE RIDDLE:

I recalled, when the sun was about to set on 18 April 1982 I had heard frenzied alarm calls of the cheetal. The calls had come from the direction of the northern gate of the Range Office Compound. When asked about the calls, the staff at the Rest House had said that the cheetal regularly came to the old cart track near the northern gate to graze on the succulent short grass that grew on it, and that they must have seen the tiger or a leopard they were calling out at. An hour later the incident had taken place at the edge of this cart track.

One could only guess that the tiger had been waiting in ambush for the deer when, all of a sudden Uma Shankar happened to arrive and sit down right there, near the hunting tiger. The tiger must have been taken by surprise and, being a tiger, reacted with a violent attack, killing him on the spot. The tiger would have taken a deer had Uma Shankar not surprised him at the scene. Was it not an accident?

I had never come across in the stories by Jim Corbett or Kenneth Anderson, or heard an experienced hunter discuss a situation where one had to identify from among a number of tigers living in an area a tiger who would be a future threat to human beings. Moreover, it was quite early to call it a case of man-eating tigers. There had so far been only

two attacks by tigers on human beings. The first one was recorded as an accident because the tiger had not eaten from the human kill, and the second one, prima-facie, looked like another accident.

It was a wildlife conservation management problem – a puzzle to be solved. And the puzzle consisted of a few questions that needed to be answered:

1. Was the incident of Uma Shankar's death an accident, or a deliberate case of man-killing by a man-eating tiger?
2. How many human lives should be lost before the Forest Department deems it fit to declare a tiger a man-eater?
3. Which one out of the three tigers was responsible for the attack?
4. What action was to be taken if the investigation indicated that it was not possible to arrive at definite conclusions with regard to the above two questions?

But we had no known technique that could answer these questions.

THE KEY

For the purpose of addressing the question whether these incidents were sufficient to declare a tiger a man-eater, I felt the answer lay in continuous observation of the behavior of the three tigers. Moreover, it was not possible to foresee a time limit for monitoring the tigers using radio-telemetry to identify the man-killer. Also the equipment, skills and man-power needed for full-time radio-tracking of three tigers were not

available with the park authorities. I did not want to wait for another tiger attack or a human kill to determine the identity of the man-eater. But we needed results in shortest possible time-frame so that a wildlife manager could respond to the situation before another human kill took place.

The alternative available to me was a technique I had been working on for quite some years now. It was based on a fundamental presumption that there is a strong bond between an animal and its home, which does not let it leave the place unless it finds serious threats to its existence in the place. This bond explains why we come across the same animal again and again in the same neighborhood in the forest – be it a barking deer, a bear, a leopard or a tiger. Within the area occupied by them the individual animals move about for short intervals from one part of its home turf to another. At any point of time the occupancy of a part of individual animal's turf is directly related to its activity. Therefore, if it is possible to observe the activities of each of the three tigers there was a possibility of detecting the difference in their behavior and reaching at a conclusion about which one of the three tigers was exhibiting aberrant behavior.

With this basic premise of the strong bond between individual animals and the area it lives in my investigation became a matter of defining their immediate habitat occupancy areas and observing how they behaved in their occupancy areas. I did not have to first find out their territories and then

cover large forest areas, engage large manpower of specialists on behavior studies and then, after a long investigation period come to the conclusion I was looking for. I needed quick results, and my approach effectively cut down my hurdles in my investigation. But first I had to determine how their immediate habitat occupancy was arranged around Sonaripur. In mapping individual movements on a combined Habitat Occupancy Map lay the key to the answers to the questions I had to answer.

DETERMINING INDIVIDUAL TIGER HABITAT OCCUPANCY

The Range staff was familiar with the traditional method of tiger census, described in detail by S.R. Choudhury in the past issues of CHEETAL in 1970; my approach drew upon its strengths. With some modifications in it I set about collecting information required for mapping out the land tenures of the tigers in the area.

Impression pads were made on all roads, cart tracks and fire-lines around Sonaripur using the soil at the sites (Fig. 1). Besides the stretches of roads with thin layer of dust over hard surface were treated as natural impression pads and treated as a part of the observation canvas. The staff of Sonaripur was used to the field work they did during tiger census exercises. However, the inadequacy of their skill in tracing pugmarks had been one of their short-comings. The staff willing to participate in monitoring tigers, which included V.N. Singh, the Range Officer, were imparted skills for improving their pugmark

tracing abilities.

Normally, the left hind foot is used as a standard for comparing the pugmarks of tigers. But I had to deviate from this practice because there was a deformity in the right hind foot of the male tiger in eastern phanta; it had an angularity in its intermediate pad. If accurately traced, the imprints of the right and left hind feet of a tiger are like mirror reflections. The deformity was discernible because it stood out in every imprint of the right hind foot of this tiger when the impressions of the two feet were compared. I treated it as a significant identifying feature, and switched the standard system of tracing pugmarks from left to right hind foot for monitoring the movements of the three tigers.

All the sites were visited morning and evening and the tracings of pugmarks, along with other details including stride, straddle, placement of pugmarks, etc., that were needed to identify individual tigers, were recorded on a standard format. After each recording of observations the observation sites were wiped cleaned and made ready for the next reading. In addition, all past events that had involved confrontation between tiger(s) and people prior to 18 April 1982 were also recorded and the sites indicated on the map.

THE BREAKTHROUGH

Before the tiger attacked Uma Shankar, some noteworthy incidents had taken place around Sonaripur. They were significant pointers to the development of aberrant behavior of a tiger in the area.

One winter afternoon of 1981-82 – date not given – a Forest Guard was riding back to Sonaripur on his bicycle on Salukapur-Sonaripur forest road. He had his woolen pullover slung over the handle-bar of his bicycle. Suddenly, a tiger emerged from the sal forest on his right and intercepted him. It was too late for the Forest Guard to check himself. As he sped by, the tiger took a swipe at the rider. His woolen pullover was caught in the attacker's claws, and the tiger was left behind worrying his pullover. The Forest Guard arrived safely at the Sonaripur Range Compound and narrated his incident to the forest staff. I marked the spot of this incident on my map.

Soon thereafter (date not given) a male tiger attacked another Forest Guard, Sohan, on the same road and near the same spot. Sohan was on his way back from Salukapur, riding his own bicycle and pulling another one belonging to his colleague along with one hand. While he was passing through the sal forest on the road, he spotted a tiger watching him intently from a distance of about fifty feet in the forest on his right. Sohan tried to ignore the tiger and concentrated on speeding up his departure from the menacing spot. But the tiger had made up his mind. He suddenly rose and rushed out at Sohan.

Sohan was young, and a fighter. He did not lose his cool. He dismounted from his own bicycle and let it fall to the ground. Using his friend's bicycle like a shield he lifted it up with both hands and banged it sharply down while shouting at the tiger. The tiger stopped and took a few steps back. Sohan repeated it a

couple of times more and forced the tiger to turn round and step away from the road. Then he picked up his own bicycle and, keeping himself between the two bicycles, he started walking up toward Sonaripur. He kept a wary eye on the tiger, who gathered his wits and came back after him again, growling his annoyance. Once again Sohan repeated his actions and compelled the tiger to retreat. This happened a few more times till Sohan came out of the sal forest. The shelter of Sonaripur Range Compound was now within sight. The tiger did not pursue him further, and the brave man reached Sonaripur, unharmed. I marked the spot where the tiger had chased Sohan.

Of the later incidents, I marked the spots on my map where on 13 April 1982 a male tiger was seen to boldly walk up along the boundary of Sonaripur Range Compound in broad daylight; the spot where Uma Shankar was killed; the direction in which the tiger had carried him off into the grassland; the movements of the tigress and the two male tigers around the waterhole and the Range Office Compound on the night of 18 April 1982; and the spot from where Uma Kant's bones and blood soaked vest were recovered before the hail storm had made us abort our search on 19 April 1982.

In the afternoon of 20 April, 1982, I along with the Range Officer resumed our combing of the eastern grassland with a hope to know more about the tiger that had fed on human flesh. The Range Officer had two riding elephants ready for the search. I rode one of the elephants and the Range Officer

followed me on the other.

We went down the road to Belrayan, eastward from Sonaripur. Since grasslands in Terai get flooded during the rainy season, the road was constructed on an earthen dyke-like structure. At intervals it had arched culverts build in it to allow the flow of the flood water from one side to the other of the road.

After about a kilometer and a half from Sonaripur, I stopped my elephant at a spot on the road where, unknown to me, there was a culvert underneath. I stretched out my left hand at the phanta on our left and asked the Range Officer if we had passed the spot in the grassland where we had collected Uma Shankar's belongings on the previous day. Before he could answer, pandemonium broke loose. The elephants trumpeted and screamed and went out of control. We were almost unseated from their backs. As I clung to the ropes of the mattress tied on my elephant, and struggled to keep my balance, I saw how far I might have fallen had I lost my seat on the elephant back. It was quite a fall, for the height of the road added to the height of my seat on the elephant back.

Suddenly, with a loud "whoomff" a huge brown projectile exploded out of the culvert. The air shook with its power. It was a sight similar to what one witnesses in the Circus when a man is shot out from a cannon. It appears the tiger was lying asleep in the culvert when I spoke from the road above him. At my voice he had bolted out of the culvert and leapt into the grassland on the right, took a couple of bounds and stopped fifty feet from us to stare back at us.

He was a large tiger. We descended from the road and followed the tiger on elephant back. I wanted to photograph him with a tele-lense, but the tiger did not give me a chance: he quickly vanished in the tall grass. The swaying of grasses we noticed he had headed for the sal forest on Sonaripur-Belrayan road. We lost him about two hundred meters from the culvert.

We returned to the culvert and descended from the elephant back. I entered the culvert and found tiger hair on its floor and on its walls, and the spaces between bricks on its floor were also stuffed with tiger hair. It was a regular resting place for the tiger. Outside, it was very hot in the grassland, but inside the culvert it was cool and airy. Light breeze flowed through it as the culvert provided tunnel-effect to the air at ground level. There were no flies or other insects that would disturb the tiger's sleep. When we thought the tiger should be lying somewhere in the cool shade of sal trees, he had found the best place to relax and digest his meal, undisturbed. It was a new addition to my knowledge. We made it a point to check all the culverts in the grasslands, and I was even thinking of a design to turn a culvert into a trap for tiger. We, incidentally, found all culverts in big grasslands around Sonaripur in use by tigers.

The encounter with the tiger on 20 April, 1982 was recorded on my map. On 26 April 1982 this tiger walked down the Station road toward Sonaripur and turned into the cart track where Uma Shankar had been killed. On 27 April 1982 the tiger walked back towards Sonaripur along the Belrayan-Sonaripur road.

He came upto the culvert form where he had been flushed out on 20 April 1982, and turned South into the grassland South-east of Sonaripur. On 28 April 1982 he walked up the Salukapur-Sonaripur road toward Sonaripur.

Other incidents recorded over the next few days of my stay at Sonaripur included marking on the map the trail of the tigress who, on the night of 20 April, had walked down to Sonaripur from Sonaripur Railway Station and turned into the western grassland, where it killed a hog-deer. She visited Sonaripur again on 23 April 1982. On 24 April 1982 she drank water at the Sonaripur water-hole and went up the Station Road into Barbeta Forest Block, north of the Railway line. Her calls and movements on the subsequent days were heard in the forest and grassland west and north of Sonaripur. These were recorded on the master map.

The third tiger was not a very frequent visitor to Sonaripur. On 21 April 1982 his tracks were found on the Bankey-taal road, about three kilometers West of Sonaripur. This tiger came to Sonaripur again on 27 April 1982 and turned back along the Station road. On 29 April 1982 its trail was seen on Bankey-taal road.

On 30 April 1982 I had collected my final observations and prepared the individual tiger occupancy map for the area.

THE MAN-EATER

Was Uma Shankar's Death An Accident?

In order to answer the call of nature, Uma Shankar had crossed the trench and sat down

only a couple of feet from the outer rim of the trench. He would not have done so and lost his life had there been a serviceable toilet in his house.

The grass behind a small *Helicteres isora* bush, about 3 feet from the spot where Uma Shankar came and sat down, was pressed down by the heavy body of a tiger. Several tiger hair were found clinging to the grass blades in this depression. The tiger had been sitting here for quite some time. Either Uma Shankar did not see the tiger or the tiger did not given him any chance to run away and killed him. Uma Shankar had practically stepped right on top of a tiger waiting to secure a prey. This points it out as a coincident, therefore an accident.

On the basis of the two points presented above the incident qualifies to be treated as an accident.

Was The Killer A Man-Eater?

We cannot ignore a significant fact: the tiger had carried Uma away and consumed his flesh. The tiger thus had introduced himself to human flesh as food. But it was an isolated incident that did not tell that he was a habitual eater the flesh of a human being. At the same time it also did not rule out the possibility of his attacking another man for food. At this stage one could only surmise that he was a man-eater in the making. He needed to be watched for his propensity on this count.

Which Tiger Was The Man-Eater?

When mapped, the evidences collected within two weeks of the incident of man-

killing at Sonaripur created a visual image of habitat occupancy by individual tigers. It showed that:

1. A tiger and a tigress occupied forest and grasslands to the west of Sonaripur; and another male tiger stayed in the north, east and south of Sonaripur;
2. The range of the western male tiger extended from the elephant proof trench round the Sonaripur Range Compound and the Station road westward in the direction of Bankey-tal. We may refer to him as the 'Bankey-taal tiger'
3. The large male in the north, east and south of Sonaripur kept himself east of the territorial limits of Bankey-taal tiger. We may call him the Sonaripur tiger.
4. The male seen on 13 April 1982 was the Bankey-taal tiger who did not enter the grasslands or forests covered by the large male of eastern Sonaripur;
5. The tigress occupied a range that was part independent, and part overlapping with both the tigers. The forest and grasslands South-west of Sonaripur formed the major part of her range. She shared with the Bankey-taal tiger the grassland west of Sonaripur, and the area north of the Station. She also shared the thin strip of forest between the Station road and the railway line with the Sonaripur tiger.

Fig. 1 is a sketch map prepared from the data collected during the 12 day period of observations made in April 1982 on tiger movements. It shows the lay out of the tiger

habitat around Sonaripur and the pattern of use of the area by the three tigers during the period of observation. The male tiger of eastern grassland moved frequently around Sonaripur. The movements of the tigress were mostly confined to the grassland and forest south and west of Sonaripur and north of the Station Road. She never visited the forest to Rehta Block, north of Sonaripur complex, where the first human kill had taken place. The young male was the least frequent visitor to the Sonaripur area.

The map clearly brought out occupancy of the forests and grasslands around Sonaripur of individual tigers for the duration of two weeks. Short term occupancy does not define tiger territories. It shows the current patterns of their presence in their natural habitat. Hence I use the term occupancy and not territory to describe such short term presence of an animal.

All the sites of the incidents of attacks on human beings and the site where the blood-soaked vest and bones of Uma Shankar were found fell in the area occupied by the Sonaripur tiger. It was clearly evident that it was the Sonaripur tiger which was most likely suspect for the attack on Uma Shankar on 18 April 1982.

But for months after Uma Shankar's death there was no further attack by a tiger on any human being. The incident was recognized as an accident. The Sonaripur tiger was not declared a man-eater.

What To Do With An Identified Suspect?

Had the findings been accepted my suggestion to the authorities would have been to trap and temporarily keep Sonaripur tiger in a cage at Sonaripur. If another attack on a human being took place thereafter, the Sonaripur tiger should be allowed to live its normal life, with a radio tracking collar on it; but if his imprisonment stopped attacks on human beings, send it to Lucknow Zoo. We have no excuse to hurry up with the execution of an aberrant animal as a habitual offender on the basis of one or two accidents in which it may have been involved.

Validation Of Individual Occupancy Mapping Technique For Predicting A Man-Eater In The Making

In 1982, the idea that it was possible to predict a potential man-eater, and that there was a methodology to identify such an aberrant tiger was not yet born in conservation circles. The result of the preliminary study made at Sonaripur was, therefore, not recognized as reliable.

But Sonaripur tiger did turn into a man-eater and was eventually hunted and eliminated three years later. After he had taken 15 human lives. Between 1982 and 1985 the Sonaripur tiger had killed 15 persons. Table 1 is the official record of human kills made by tiger(s) at Sonaripur between 1982 and 1985.

When the sites where the man-eater of Sonaripur had killed his victims were mapped it was seen that all the kills had taken place in the area occupied by the Sonaripur tiger. The man-eater was killed on 4 April 1985, and he

fell at a spot that was well within this area of occupancy. Fig. 2 shows the Habitat Occupancy by the three tigers in April 1982 and its relationship with the sites of kills made till the death of the man-eater in 1985. Evidently the technique using individual tiger habitat occupancy map for identification in 1982 of a man-eater in the making was validated from his career records as a man-eater till his death in 1985.

New Light On The Man-Eating Behavior Of Tigers

The analysis of the Table on the dates and deaths of the victims of Sonaripur tiger brought up new facts that they did not conform to the expected behavior of man-eaters. The attacks on human beings by the Sonaripur tiger did not follow any pattern. The tiger had killed 3 persons in 1982 – one each in March 1982, April 1982 and December 1982. In 1983 there were five human deaths, two in March 1983, one in May 1983 and two in December 1983. No human being was attacked for one entire year in 1984; but he killed 7 people in 1985: 5 persons in one month – January 1985, and two on one day – 3 April, 1985. When the man-eater was shot dead on 4 April, 1985 he was found to be an adult male tiger in the prime of his health, without any visible disability that could affect his ability to hunt his natural prey. This fact is also supported by his survival without having to kill human beings during the long gaps between his attacks on human beings.

Yet, such unusual behavior about attacks

on human beings is to an extent comparable with the behavior of man-eaters in Sunderbans in West Bengal, where the author had worked as Field Director during 1986-87. Sunderban man-eaters did not stalk people in the neighborhood of villages, as did the man-eaters of Kumaon in the stories by Jim Corbett. All attacks on human beings in Sunderbans took place inside the forest. Sunderbans did not have habitual man-eaters: any tiger would kill a human being, and the same tiger may not kill a human being again. I consider Sunderban tigers as opportunistic man-eater: they take one if chance permits! I think the Sonaripur tiger was also an opportunistic man-eater. And I will not be surprised if similar opportunistic man-eating behavior is exhibited by a tiger in areas where generations of tigers have been living unmolested in well protected tiger habitats, and where tigers have lost fear of man.

DEALING WITH MAN-EATING CASES

Whether a tiger is an opportunistic man-eater or not, the loss of human life by attacks from tigers or leopards can not to be taken lightly. At the same time the lives of innocent animals also must not be allowed to be wasted by their wanton destruction on the pretext of eliminating man-eaters, for they play active part in the sustenance of the natural life support system of our world, and they are a part of our natural life insurance policy. The conflict between conservation of endangered species of wildlife and the popular sentiment of human beings gets escalated once people become impatient and start asking hard

hitting questions about the efficacy of forest staff in protecting them from wild animals.

A forest officers' dilemma lies in the fact that he has to find the right way between his conservation duties and the crisis of life. In recent times innocent animals have been declared man-eaters and killed for appeasing public sentiments.

The study presented here tested a pragmatic field method to find out answers to the questions one usually has to answer. The field work had covered a period of 12 days, from 19 April 1982 to 30 April 1982. But it took 3 years after the identified tiger was shot dead as a man-eater in 1985 to illustrate that the technique used at Sonaripur was dependable for identifying a man-eater in the making. Besides it had some other advantages over all other techniques including radio-telemetry:

- a. It did not depend upon the capture of suspected animals to radio collar them;
- b. It was a non-invasive technique and did not interfere with the normal pattern of life of the animals.
- c. The conclusions were available in a reasonably short time-frame.
- d. It was possible for the forest staff to use the technique without stretching their skills, resources and independence.

The incidents of conflict between human beings and wild animals are expected to increase with the surplus populations of wild animals from well conserved areas spilling over into human landscape and the fast urbanization of human landscape outside the protected conservation areas. Taking proactive action is a way out of the dilemma that faces people and wildlife conservation ethics. But proactive action can be activated only if we develop our professional skills through development and application of appropriate techniques. There is more to the Habitat Occupancy Technique than shown by its use in the case of Sonaripur man-eater in the making. I found it a valuable tool that can forewarn a wildlife manager in time to help him prevent development of serious conflict situations between people and endangered wildlife species.

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A WILD TRIP TO CHITWAN NATIONAL PARK, NEPAL.

Shivani Gupta*

Aligned along the Indo-Nepal border, in the lap of the Churia hills lies the Chitwan National Park. This territory is politically in the limits of Nepal. Way back in the year 1973, this wilderness was declared as the first National Park of Nepal. It was later also declared as a World Heritage Sites for harbouring unique biodiversity. Chitwan National Park is of great attraction for the visitors who come to see tigers and rhinos. According to the most recent census there are approximately 82 tigers and 544 rhinos currently inhabiting this National Park.

The Gandak river (called Narayani in Nepal) a major tributary of the Ganga derives water from these thick forests. The lush green grasslands, the wetlands and the marshes provides suitable habitat to all kinds aquatic and riparian wildlife.

Unlike other foreign countries, Indian citizens do not require a passport and visa to travel to Nepal. A proof of identity is enough to cross over.

In the summer of 2011, me and my parents decided to do a road trip to Nepal. We entered Nepal through the Triveni barrage in Bihar. This barrage with 38 pillars divided equally between India and Nepal, has an amazing architecture and design; the

structure is not very far from the confluence point of the three rivers merging together to form Gandak (thus it derives the name "Triveni").

As soon as we entered Nepal, we came across an alarming sight. A Nepali man was selling a really big fish, it had been cut in half and was thus difficult to identify. It weighed about 15 kilograms and was caught fresh from the river Gandak. On closer inspection, to our horror, we realised that these were the butchered remains of the rare Gangetic River Dolphin. I realised why they were so threatened. In the recent past Gangetic dolphins were frequently sighted in many rivers of India, including Ganga, Yamuna, and the Chambal. Today they have been restricted to small pockets.

Sad at this terrible sight, we however moved ahead. Our bumpy ride continued for about 30 kilometres. The rest of the stretch was extremely smooth. After entering Nepal, within an hour we got glimpses of the snow-capped Himalayas. The weather was rather cool for the month of June, the roads clean and lined with vegetation on one side and the mountain river Narayani, never leaving the side. It was brimming with water and flowing in a playful mood. The river was extremely beautiful, the stones white and the water

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looked ideal for rafting.

The ride to the Chitwan National Park was fun-filled, but none of us expected what was in store for us. We were mesmerized by nature's bounty and all the wildlife this place had been gifted with.

We reached Sauraha, the main entry point to the park, as well as the prime spot for lots of private tourist lodges and resorts. The most amazing experience was to learn how villagers and tribes own or manage forests and the land, unlike the present system in India or any other country. Thus these villagers become stewards of wildlife protection with a well managed private entrepreneurship. The other good thing about this mechanism is that it allows a healthy competition and good service, so tourists are not financially burdened when they plan a trip to this park.

The people in Nepal are very warm and welcoming. Guests are treated with utmost respect and care. The year 2011 was the tourism year in Nepal. All the hoardings in Nepal announced, '*pahuna ko satkar, nepali ko sanskar*', which means that it is the moral duty and culture of every citizen of Nepal to heartily welcome the guests. This proved to be true during our stay.

After our short detour to Sauraha, we reached Kasara which is the heart of Chitwan National Park. To experience Chitwan in all its glory, you have to visit Kasara. We made a short visit to the office of the Chief Wildlife Warden of the Chitwan National Park. There is some very interesting history associated

with this place. The office building was the first building made of concrete in Nepal. Built in the year 1931, the entire construction material was brought by workers on foot from India (the nearest railhead of Bhikhathori). Near this historical building there was another building close by which was used as a rest house for kings and emperors of India and Nepal and other neighbouring countries. It was also used by distinguished British officers who at that time used to come here as a part of the hunting parties. Here we also happened to come across 2 orphaned rhino calves. Their mother had unfortunately been electrocuted. Touching and playing with them was an amazing experience.

We were then escorted by an official to a huge wooden enclosure. I took a full round around it and saw nothing. My eyes popped out when the official showed us a tiger at a corner of the enclosure. It was wounded and I felt goose-bumps when we were told that it was a man-eater. We were then taken to the crocodile breeding centre where muggers and gharials were being bred in captivity. It was amazing to see different phases of their life ranging from a few centimetres to adults which were many a feet long.

We decided to spend the night at the Narayani River Lodge on the banks of the river Narayani. The dinner was traditional, spicy and filling. We were completely worn out; the cosy beds of the bamboo huts at the lodge felt much more inviting. The view of the starry night sky with a few clouds drifting by, and the constant sound of the cicadas and

the occasional calls of the barking deer calls lulled me to sleep.

The loud clap of thunder woke me up to an unusually wet and overcast day. By the time we got ready the heavy downpour had already reduced to a light drizzle, which was a good thing. We were guided to a short trail which was lined by huge trees, lots of ferns and several varieties of orchid species. We reached a point, which was elevated from the ground and the next moment my eyes saw two elephants approaching our way. I soon realised that they were going to take us on this morning's visit to the jungle.

We moved at a lazy slow pace through a short stretch of grassland and reached the river Narayani. We crossed the river on the elephant, and I felt uneasy when the water reached just below the elephant's ears. We entered a stretch of meadow where tall elephant grass (narkat) grew. But it also proved to be a feasting ground for the elephants who while walking enjoyed their green meal and also left behind a fresh trail of green elephant dung.

We first came across a few barking deers, a hog deer and then a wild boar. Then we started moving deeper into the forest. The mahout was a friendly, experienced and knowledgeable person who kept on telling about the things that we ought to know now and then. It was a few minutes after we had moved aimlessly in the tall grasses, in a vain

hope of seeing some large mammal when we heard a noise. It was kind of a loud grunt or a snort. Both the elephant and the mahout were suddenly alerted by it. Soon enough we approached a small muddy and swampy pool, where we saw two male and a female rhino in a muddy pool. The sight was spectacular; there was fast and furious clicking of cameras to capture these extraordinary moments. But suddenly the atmosphere got charged. We heard wild grunts from both the rhinos and saw them take their defensive positions. In a matter of few minutes the small pool turned into a fierce battlefield of the two great beasts. It became dangerous for us to be there any longer so the mahout moved away. I still see the reel of those events reappearing in my head. As we moved further we came across a group of rhinos, there was a male, two females and two calves. The site of this happy family was marred by the reality of what they face. Rhinos are now endangered and poached for its horn which is perceived to have medicinal properties and is exported to foreign countries (especially south-east Asia). This would be our last day at the park.

Even though our stay in the Chitwan National Park was short, I enjoyed every moment of it. The lush green forests, the snow-capped mountains, and the wildlife shall always take me back to the wild haven that is Chitwan National Park.

A CASE STUDY ON MIGRATING WILD ASIAN ELEPHANTS (*ELEPHAS MAXIMUS*)

in Baripada and Balasore Wildlife Division, Orissa

Nimain Charan Palei

*1, S.S. Srivastav *2, Dr L.A.K Singh *3, B.K Panda*4 *5 K.K. swain

Introduction

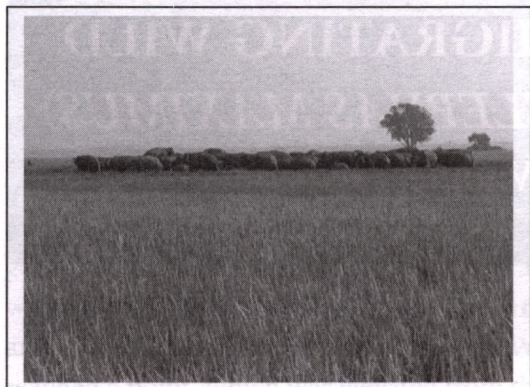
The Asian elephant (*Elephas maximus*) population in India is about 50% of the world's population (Sukumar et al. 2005). The population is mainly spread across 11 Elephant Reserves which cover an area 1,10,000 sq km forest (Bist, 2002). Indiscriminate felling of forests, encroachments and development activities, such as industry, mining, and dams have led to the shrinkage and degradation of elephant habitat. These activities have restricted their long-range movements and they are now probably confined only to north west India (Uttaranchal and Uttar Pradesh), southern Western Ghats (Karnataka, Kerala, Tamil Nadu and small parts of Andhra Pradesh), central India (Jharkhand, Chhattisgarh, Orissa) and north-east India (Assam, Arunachal Pradesh, West Bengal, Meghalaya, Mizoram, Nagaland and Tripura).

The central Indian population of 2400-2700

elephants is confined to Orissa, south west Bengal and Jharkhand. In this area, elephant migration happens from Jharkhand (via West Bengal) to Orissa. Deuli Range under Baripada Forest Division faces major problems related to conflict during these migrations. They stay for about 15 days, and the situation becomes tense for the Forest Department and the District Administration.

Presently inhabitants use drive-away techniques which include making noise (drum beating, fire crackers and firing gun shots in the air), use torch lights, pelt stones and sometimes throw burning torches. Machans are used for guarding the crops. While family herds are easily deflected, single bulls were difficult to ward off. Affected villagers have suggested methods like regular patrolling by forest department officials electric fencing, stone walling or lighting the village during night hours and some suggested culling of elephants. Through our observations, we try and

O/o Principal Chief Conservator of Forest (Wildlife) & Chief Wildlife Warden, Odisha.



Migrating Elephant herd from West Bengal



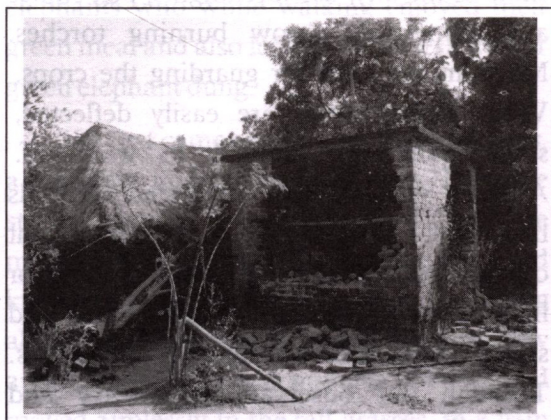
Migrating Elephant Tusker from West Bengal



Human disturbance the Herd



Crop Damage by the Migrating Herd

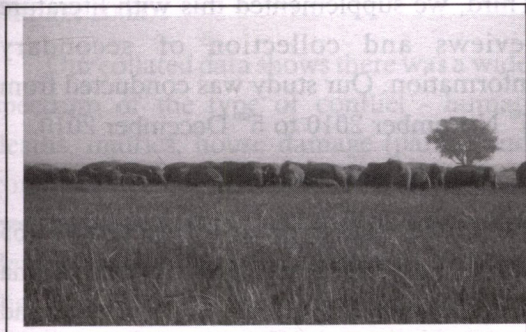


House damage by Migrating Elephant



Utensil damage by Migrating Elephant

MIGRATING ELEPHANT HERDS FROM DALMA WILDLIFE SANCTUARY VIA- WEST BENGAL TO ODISHA



Migrating herd playing the crop field



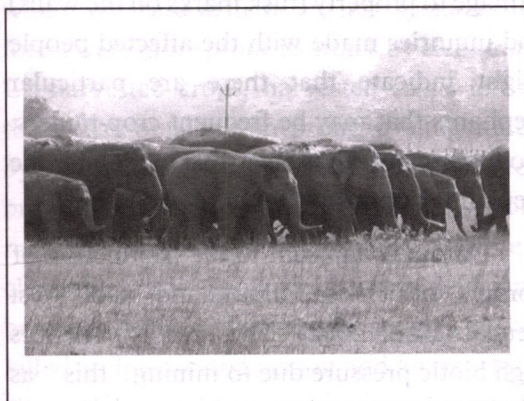
Elephant herd enjoying the crop field



Juvenile male help to test their strength



Elephant calves continue to get mothers



Elephant moves towards Kuldiha Wildlife San.
elephant



An elderly and experienced female

identify methods how conflict can be reduced.

MATERIALS AND METHODOLOGY

The elephant habitat in Chhotanagpur is in the Palamau, Singhbhum and Dalnhum forest. To the north of the Mahanadi River, elephants are distributed across Baripada, Karanjia, Keonjhar, Bamra, Rairakhol, Angul, Dhenkanal, Athamallik and Athagarh Forest Division in Orissa. Bio-geographically this region falls in the Chhotanagpur plateau in the north of Eastern Ghats (Rodgers and Panwar, 1988).

Baripada Forest Division (22° 33'45"- 21° 17'0"N; 85° 45'30"-87° 13'15"E) is situated towards northern most part of Orissa (Fig. 1). It is bound by Singhbhum Medinapur district in the north, Balasore district, Nilagiri and Keonjhar in the east. Balasore Division is bordered by the Subarnarekha river. On the banks of the Subarnarekha in West Bengal, sugarcane cultivation draws wild elephants of Dalma, Tholkabad during the winter (November-December) when the crop matures. Deuli and Suliapada border southern West Bengal, where there are good patches of Sal forest in a matrix of low lying cultivated lands. During this time people drive elephants to Orissa, and this results in serious conflict on both sides.

Data collection was broadly done at three levels. First, through field surveys and direct observations. This also included interviews with farmers and staff to understand the movement patterns of elephants. Second, through interactions with officials and field

staff of the Forest Department we understood their perspective on conflict. Third, we supplemented this with literature reviews and collection of secondary information. Our study was conducted from 5th November 2010 to 5th December 2010.

Results and Discussion

We found that a group of elephants (65 individuals) has been migrating from Dalma Wildlife Sanctuary, (DWS) of Jharkhand (via West Bengal forests during November-December). The number of elephants per herd ranges from 50-150. The total number of elephants in this herd was 65. This herd can be frequently seen in Kathapal village of Nilgiri Range. This herd consists 7 adult tuskers, 12 sub adults, 4 adult females, 9 sub adult females, 21 juveniles and 12 calves. In terms of distinguishable tuskers: one elephant does not have the left tusk while the other elephant has a broken left tusk (Table 1). The assessment of the extensive damage to property (tusk marks on the walls) and inquiries made with the affected people might indicate that there are particular elephants that may be frequent crop-raiders. However no one has been able to identify the elephants responsible for human deaths.

Dalma is adjacent to the tri-junction of borders of Orissa, Jharkhand and West Bengal (Bisht 2002). The area experiences high biotic pressure due to mining; this has resulted in shrinking and degradation of elephant habitat, forcing elephants to move out of the traditional habitat to raid crops

to meet their energy requirements and seek better habitat else where (Swain and Patnaik 2002).

Our collated data shows there was a wide spectrum of the type of conflict - human deaths, injuries, house damage (partial and complete), crop damage, destruction of bananas plantations, and cattle and poultry deaths through trampling (Table 2). Among the long-term measures, barriers such as trenches or fences are effective, provided they are regularly maintained.

Change in cropping patterns around elephant areas to include non-palatable crops is an important measure, but it has to be accepted by the local people (Fig. 2, Table 3). By talking to residents and forest department staff, a qualitative assessment was made of factors responsible for crop damage. Elephants were found to use Reserve Forest (RF) patches for shelter during the day as refuge for raiding crops. Crops near forest or where agricultural fields are interspersed with forest were more prone to attack by elephants. Un-harvested crops, harvested crops left in the field or outside were prone to being raided by elephants. As also houses which stored brewed rice and country liquor made from mahua flowers. After drinking the brew elephants run amok destroying field and breaking houses. During our study a tusker killed an intoxicated person and an ox which was tied near paddy storage.

The agricultural pattern in West Bengal has undergone change from being rain

dependent to now being irrigated for cash crops. On a broad spatial scale, the arrangement of landscapes (forest and agriculture matrices) are an important determinant of crop depredation.

The passage of elephants in these two districts - Mayurbhanj (total area: 17489.82 sq km, forest area: 5264.82 ha) and Balasore (total area: 1,968 sq km, forest area: 447.37 ha) show that elephants use both forest and non-forest areas. They use forests when chased by the people or during the day time. During the night they tend to visit crop fields. Usually the route followed by elephants is very close to human habitations. Therefore availability of forest cover in fragmented areas is a strategic requirement for elephants to avoid human-induced interference.

Conflict is further aggravated by crowding of people, no protocols in place for dispersion that prevents movement of elephants. We have instituted the following measures where five anti-depredation squads consisting of about sixty personnel were deployed. The squads are equipped with fire crackers, drums, lights and sirens. The Collector was updated about elephant movement, while the sub-Collector was present most of the time during this operation. The Superintendent of Police had deployed one platoon to help in crowd management. The Superintendent Engineer implemented power cuts in the migratory route of elephants. The sub-divisional Public

Relation Officer addressed the public about elephant movement. Villagers were cautioned about not storing handia, mahua, boiled paddy, soaked rice and other fermented materials. The quarry operation were requested to stop drilling and blasting to minimize disturbance to the migratory wild elephants. Two teams have been formed with foresters, revenue and livestock inspectors to assess crop and house damage and cattle death.

As mentioned above, Forest departments and communities have used several methods and techniques to deal with this problem, as it is not possible to eliminate conflict (Singh, 1989). As we have shown several measures can be taken to contain and manage conflict. However even though conflict has been reported periodically in the fringe villages around our study area, the destruction of forests could cause a serious crisis for both elephants and humans in their future.

THE STORY OF THE HEAD VILLAGE CHIEF OF PAKKE TIGER RESERVE

Nandini Velho*

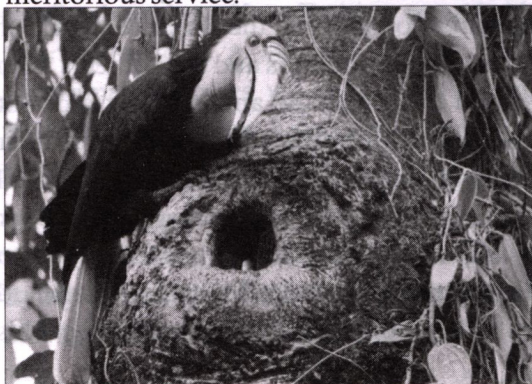
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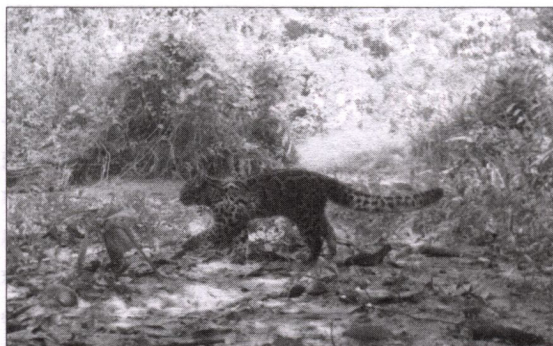
I visited Pakke during first scientific estimation of tigers, copredators & their prey in 2005 as a observer deputed by Project Tiger Govt of India (Now NTCA). Mr Tana Tapi, the hero of this artical was the Director Pakke Tiger Reserve. It was a pleasure to be with him for two days and one night inside Pakke. He himself drove in the interior parts of the reserve through rough and tough roads which he had himself got constructed very recently. We camped by the side of a river deep into the TR and saw fresh pugmarks of the tiger 100 meter away from where we were camping. A director with down to earth approach was in full command of his territory like a tiger in his prime youth. A highly dedicated officer with deep knowledge of his area & people could inspire any body & every body. I could realize that tigers of Pakke are safe in his hands but Alas! would he be the last of his kind in modern day forestry.

We were walking through Gumte village, the ancestral home of Tana Tapi- the legendary leader of Pakke Tiger Reserve. This village falls just outside the northern boundary of Pakke Tiger Reserve. Village elders told us that the bamboo that Tana Tapi's great grandfather had planted had become really tall. In a moment of nostalgia, he tried to imagine what life would have in store for him had his family stayed on in Gumte. After a while, he remarked that he would have atleast become a *gaon burrah* (village father). After long years, both of us still don't know how to give or receive compliments. So, in muted admiration I muttered that surely he would have become atleast head *gaon burrah*.

But my mind was filled with thoughts about how in Pakke we would have lost our head *gaon burrah*. It was with the coming of Tana Tapi, that Pakke's real conservation story started. From 25 to 140 people

employed. A 13 km road was upscaled to 41 kms to better provision staff. Thirty two anti-poaching camps were built when only 2 existed before. Being a Nyishi himself, he has created an excellent platform for the forest department to interface with the local community. The *Ghora Aabhe* which is a group of *gaon burrahs*, enforces their customary laws and helps in protection around the buffer area. He has been awarded the Carl Zeiss award, Bagh Mitra award, Sanctuary Asia-RBS wildlife service award, Arunachal state gold medal award for his meritorious service.



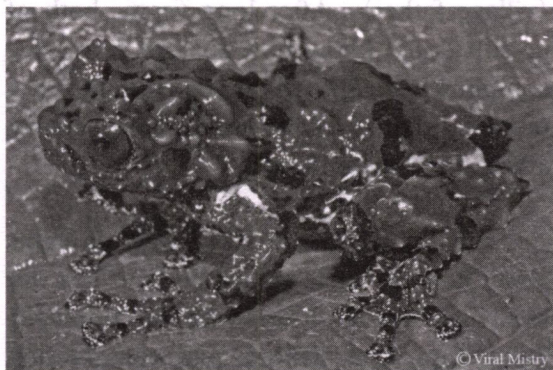


Marbled Cat

Yet Pakke's conservation story started only as recently as 2006, with the coming of Tana Tapi. An almost year long transfer in 2008, due to political reasons saw a reign of anarchy prevail in Pakke. The Ghora Aabhe submitted photographic evidence to the top-brass of the State forest department about the tremendous increase in poaching pressure inside the park. There was an unsuccessful yet audacious attempt by poachers to steal bears that were rescued and kept in an enclosure to be rehabilitated in the wild. The heroic anti-poaching staff who were employed as casual workers and earned about Rs. 3000/-, did not want to struggle and were completely disenchanted when Tana Tapi left. Their main reason was that the permanent staff of forest guards, foresters and beat officers who earned five times the amount they did, not only stayed at home all the while, but their evening chit-chat happened in a small bustling area just adjacent to the park headquarters. Now, and previously when Tana Tapi was their leader, this was unheard of. With a mix of affection and respect, his

anti-poaching staff call him makhna. His unpredictable forays and checks into the forest have made people make middle of the night marches to their respective anti-poaching camps. There has never been time for chit-chat in the centre of town.

Yet, being head gaon burrah of this 862 sq. km tiger reserve is not easy. Even in this one tiger reserve, there are many varied contexts. For instance, around the park headquarters women are part of self-help groups and report crime to the forest department, these activities are completely absent from northern area. Unlike the lower altitudes and areas which Tana Tapi has managed to secure with his pioneering efforts, a vast portion in the northern part of the park is relatively inaccessible due to the dense vegetation, hilly terrain, the lack of trails and apprehension of the people. Many people residing in the northern boundaries around Pakke accuse the gaon burrahs who cooperate with the forest department in the park headquarters, of selling their land to the forest department.



Theloderma Spp Viral Mistry

Making conservation work requires a tremendous strength of personality. For instance, villagers from this remote village called Lelung just outside Pakke, have been completely against any regulation of hunting. They usually cross the river to hunt inside the tiger reserve. They have given a written memorandum about how they do not want any activity related to wildlife conservation in their village. Yet, Tana Tapi had a meeting with stake-holders from Lelung and convinced them to donate a piece of land to the forest department to build an anti-poaching camp. An area was agreed upon, and soon an antipoaching camp was completed. Local unemployed youth from the village were kept as forest watchers. However things began to heat up with the initiation of enforcement. The residents threatened to burn down the anti-poaching camp. They also wanted the job of those people employed in antipoaching to be terminated. An unfazed Tana Tapi, told them that they were free to burn it down. They should do as soon as possible. He explained to them about how they would be chargesheeted with Offences Against the State and Mischief as per the Indian Penal Code, 1860. About job termination, he told them he had no problem as long as they gave it to him in writing. This tempered down the whole movement. No person from Lelung wanted to give written proof about trying to throw someone else from the village out of their job.

There are other villages such as Sebba, where people want about 50 sq. km of the park denotified, as their growing population

will leave them with much smaller land holdings in the future. They have put tremendous political pressure through the local MLA, forest secretary and even chief minister against the demarcation of the boundary of the tiger reserve. Unperturbed by political pressure, Tana Tapi and his team go about their duty. Recently in January 2012, the forest department seized three truck loads of cane that was being extracted from within tiger reserve close to Seba village. The matter is pending in court.

The first string of awareness drives to the northern part of the park was done in 2007. Annually Ghora Aabhe members from around the park headquarters along with Tana Tapi conduct awareness drives in the northern-areas. Tana Tapi plans to create a separate range for the tiger reserve to better focus on management of the northern areas. This will make management much easier, and increase the presence of the forest department. It otherwise takes Tana Tapi two days to reach this area.

Change is slowly taking place in some of the toughest places of Pakke. Tana Tapi recalls about how Yaro Tech, a remarkable matriach who is a member of four local governmental bodies, would have an 'allergic reaction' if she even heard his name. She hails from Lumta village – a single house where a polling station is taken for the four voting members. She would accuse him of trying to steal her land to make it part of the tiger reserve. She didn't want him to step into Lumta. Today Yaro is the

chowkidaar of the Lumta anti-poaching camp. She killed a chicken for each of us when we went last met her few months ago. To the rest of the community her deadly reputation still preceeds her - when she tells guys 'marega' they know she means it. She is known to bring down a full grown male mithun (which weighs about 800-1000 kg) by herself. Yaro had to have the last say. Our goodbye ended with Yaro affectionately telling him that she'll cut his ear if he doesnt come more often.

Last year Nana Nabum refused to let Tana Tapi click a photograph of his village. Sochung village was the same place that Tana Tapi's grandfather passed away. As per the social customs of Nyishis, one is entitled to claim the land where ones recent ancestors have been burried. So this really infuriated him, when he heard Nana say that he cant click a photograph of this land. Nana's main problem was that he heard rumours that this village was going to be demarcated within the tiger reserve. The rest as they say is history, Pakke's history. As a pastor, his sermons now mainly focus on wildlife conservation. Nana's black belt in karate and supreme fitness has been put to the best possible use. He is part of the special tiger protection force, and leads patrolling efforts in the entire northern boundary. His enthusiasm is contagious. Over the last month he has continuously been after me, to write an article about how gun licenses are given too easily in Arunachal and most guns are not used for self-defense.

The future of this tiger reserve holds

much promise with Tana Tapi at the helm, especially given the state of almost all the tiger reserves in the northeast of the country (barring Kaziranga and Nameri). How things shape up, depends on if we give Tana Tapi many years and stability of tenure to manage Pakke. Pakke's conservation journey is taking shape, and we need him to leave us a conservation legacy.

Nandini Velho is a wildlife biologist doing her doctoral degree at James Cook University, Australia in collaboration with National Centre for Biological Sciences, Bangalore.

Popes' Pit viper



ECOLOGICAL IMBALANCE CAUSING MANIFOLD INCREASE IN VECTOR BORNE DISEASES

Dr. Raza H. Tehsin

The untimely demise of the iconic Yash Chopra by dengue came as a shock to the whole nation. When even the elite in India are becoming victims to vector borne diseases, what is to become of the common-man?

The reasons for the increase in vector borne diseases are ecological imbalance and global warming. The increasing human population and its fooding habits are playing are adding to it.

Frogs are almost wiped out from our subcontinent. The government has allowed frog farmers to export frog legs but under the pretext of this, frogs from other water bodies are also captured for export. In 1984 Dr. Raza H. Tehsin raised his voice against the export of frog legs from India to control the increasing malaria. Many newspapers across the world covered this news. Banswara district in Rajasthan alone exported 200 tonnes of frog legs annually. The government took the required step and curbed the export of frog legs then. Today, we've again reached the same situation.

The rice fields, which used to be full of frogs, have hardly any frogs now. Frogs are the major predators of mosquito larvae. In every wetland - flowing or stagnant - there was abundance of frogs, which survived largely on mosquito eggs and larvae. Frogs from the

water bodies have dwindled and the mosquito population increased manifolds. Today, it has become difficult even to click a good photograph of frog in the wild.

Ground water levels have gone down drastically and almost all wells have dried up. Now we have to depend on tube wells for supply of water. The water spilled from the tube wells and collected around them serves as a major breeding ground for mosquito larvae.

With the increase in global warming, the top soil dries up in summers considerably. In the northern hemisphere frogs hibernate underground in the moist soil. When the soil dries, they suffer severely.

In almost all the water bodies and wetlands of India there were numerous small fish. Most of them are called 'weed fish' like Silver Fish, Glass Fish, Putty. The number of weed fish species found in different water bodies has not yet been surveyed and ascertained. They are captured mercilessly to prepare fish pickle. The pickle from fresh water weed fish are delicious and most of the pickle makers concentrate on these fish. Even in small stagnant waters in bygone days one could see such weed fish. Their population in our rivers, lakes, ponds, dams has crashed. Most of these

fish prey upon larvae and aquatic insects. As their population has reduced considerably, the population of mosquitoes has gone up.

Many exotic fish are introduced in the water bodies for commercial purposes. There is no study to see how this affects the ecosystem of our water bodies. Some of the introduced fish are voracious carnivores, like tilapia and mongoor, which feed on small fish.

In all the major and small water bodies fisheries department releases fingerlings of five to six fish species that grow rapidly, so that they can be harvested in a year's time. The government and Panchayats give fish contracts. Some small lakes and ponds near villages, which dry up in summers, are also stocked with these fingerlings. Before the ponds dry, the fish have to be harvested. There are millions of wetlands, small and big, in our country. There is no available data for these wetlands about the number of species surviving there. From several years, the process of introducing quick harvesting fish

species is going on. Many small species of fish, which are not only predators for vector larvae but also a very important link in the food chain, have depleted. The fingerlings of these carnivore weed fish too are predators of larvae. With their dwindling numbers malaria, dangu, chicken guinea and other vector born diseases are increasing all over India.

There still is time to rectify these follies by introducing and increasing the population of weed fish in water bodies and wetlands and curbing the export of frog legs. Also, the government should carry out breeding of frogs and weed fish and restock the water bodies.

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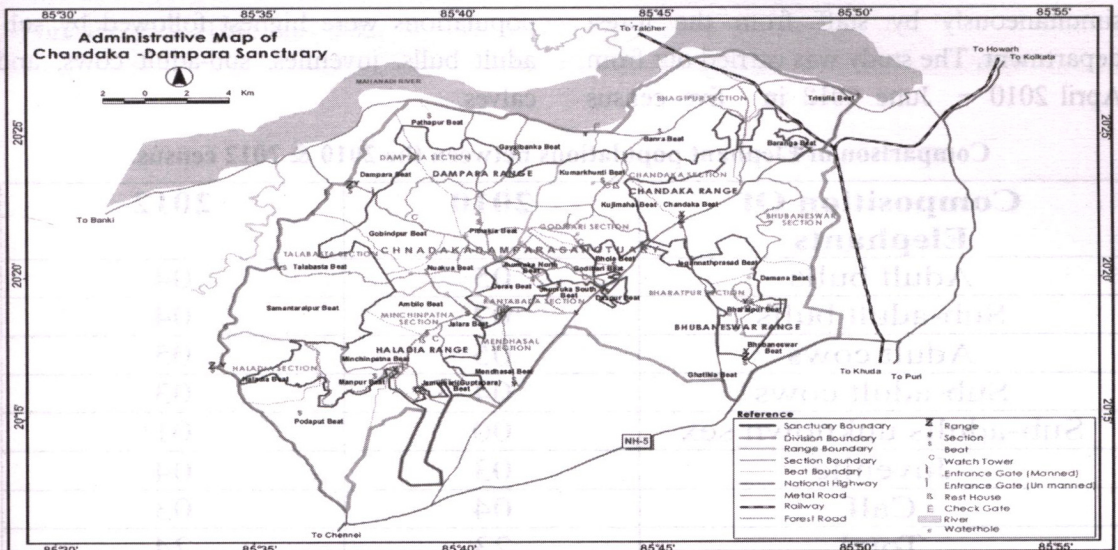
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A NOTE OF THE POPULATION STRUCTURE OF ASIATIC ELEPHANT (*ELEPHAS MAXIMUS*) IN CHANDAKA WILD LIFE SANCTUARY, ODISHA, INDIA.

Santoshi Das, Sandeep Ranjan Mishra.

The goal of ecology is to understand interactions that determine the distribution and abundance of organisms. Therefore information on population abundance is crucial to scientific management of wildlife. A major management challenge in conservation of large herbivores such as the Asiatic elephant (*Elephas maximus*) is monitoring their populations, which is crucial to assess the success of strategies devised to manage them. Monitoring their population dynamics also helps us understand various processes at landscape and ecosystem levels.

The Asiatic elephant has been listed as endangered by IUCN as the population has declined by at least 50% over the last three generations. The species is threatened by habitat loss, degradation and fragmentation. Therefore regular population monitoring forms an important part of any conservation strategy designed for elephants. For the first time we evaluated population status of elephants in Chandaka-Dampara Sanctuary ($85^{\circ}34' 42'' - 85^{\circ}49' 27''$ E; $20^{\circ}12' 29'' - 20^{\circ}26' 18''$ N) which forms a major part of central, Odisha, India.



Odisha Forest Department (Wild life)

The forest types include -- secondary moist semi-ever green forests, forests dominated by *Xylia xylocarpa*, coastal sal forests, thorny bamboo breaks (of mainly *Bambusa* sp.). Teak has been planted in many areas. The commonly seen mammals are elephants, cheetal, barking deer, mouse deer, wild pig, common langur, rhesus macaque, small Indian civet, common Indian mongoose, small Indian mongoose, and sloth bear. Elusive mammals such as the ratel and hyaena have also been recorded. The red jungle fowl, pea fowl, crested serpent eagle, great horned owl, and black headed oriole are among bird species commonly seen. A survey by the Zoological Survey of India has reported 37 species of mammals, 161 bird species, 33 reptile species, 13 amphibians species and 28 fish species.

The field data compiled was based on the total count method which was used to count elephants. All the ranges were divided into census units, which were covered simultaneously by staff from the forest department. The study was carried out from April 2010 - June 2012 in five census

units of the Wildlife Sanctuary. Different habitats including water holes were searched get direct and indirect evidence of elephants. While the elephant height is measured at the shoulder, it is also possible to do this using from indirect elephant signs. The approximate height of an elephant is measured as two times the circumference of its footprint.

Most sightings were concentrated next to water bodies, foot paths, and saltlicks. In 2010 we counted 23 elephants in Chandaka area - six from Bharatpur census unit, 14 from Sarubalia and Dholkath (7 per unit), and three from Berenabandha unit. These were mainly adults, followed by sub-adults cows, calves, juveniles and sub adult bulls. In 2012 we counted a total 24 elephants. Two were sighted from Bharatpur census unit, the three elephants from Kochilaberena watch tower, ten were counted from Jhumka, two from Dhadas, and seven from hadua water passage. Similar to 2012, the adult populations were highest followed by sub-adult bulls, juveniles, sub-adult cows, and calves.

Comparison of Elephant populations between the 2010 & 2012 census.

Composition Of Elephants	2010	2012
Adult bulls	05	04
Sub-adult bulls	02	04
Adult cows	05	05
Sub-adult cows	04	03
Sub-adults unknown sex	00	01
Juvenile	03	04
Calf	04	03
Total	23	24

REFERENCES

- Karanth et al. (2004).** Tigers and their prey: Predicting carnivore densities from prey abundance. *PNAS*, Vol. 101, no. 14.
- Krishnamurthy, V. (1991).** Elephant census: Total count method in Tamil Nadu. In censusing elephants in forests. *Proceedings of an international workshop in Southern India*, 2-10 January, 1991. (eds. U. Ramakrishnan, J.A. Santosh and R. Sukumar). Technical Report No.2. Asian Elephant Conservation Centre of IUCN/SSC Asian Elephant Specialist Group, Bangalore, India, pp.30-32.
- Lahiri-Choudhury, D.K. (1991).** Direct count of elephants in north-east India. In censusing elephants in forests. *Proceedings of an international workshop*, Southern India, 2-10 January, 1991 (eds. U. Ramakrishnan, J.A. Santosh and R. Sukumar). Asian Elephant Conservation Centre, Bangalore, India, pp. 33-45.
- Rodgers, W.A. (1991).** Techniques for wildlife census in India: a field manual. Wildlife Institute of India, Dehradun, India.
- Sagar, S.R. and Singh, L.A.K. (2001).** Elephant population estimation during 1989 monsoon in Similipal Tiger Reserve. In *Elephants in Similipal (history, status, issues, techniques and biological notes on elephants)* Vol. I (compiled by S. S. Srivastava and L. A. K. Singh), Similipal Tiger Reserve, Baripada, Orissa, pp. 55-67.
- Sukumar, R. (1989).** The Asian elephant: ecology and management. Cambridge University Press, Cambridge.
- Swain, D. (1996).** Status of elephants in Kuldiha Sanctuary, Orissa. *Indian Forester*. 122(10): 927-932.

The Tiger in Uttar Pradesh

By

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Wildlife in general, and the tiger in particular, has suffered a great deal during the last two decades. There is concern about the future of wildlife in the country in the minds of naturalists and preservationists. But the number of genuine well-wishers of wildlife, contrary to a great deal of platitudinous lip service from others, can be counted on finger tips. There is, however, growing appreciation now about the role of wildlife in the cultural and economic life of the country. Ways and means are now being found to tide over the crisis. A large number of species have been declared as protected and their shooting has been banned completely all over the country. So far tiger was not included in the list of protected animals but the sudden realization that their number had gone down considerably and the stage had come when its shooting should be banned completely, forced a large number of States in the country to close tiger shooting altogether. The one solution that occurs to every mind to protect and multiply the tiger population in the country is to exclude it from the bag list of the shooting permit. Suggestions and proposals come from various sources to adopt this well known solution to those interested in tackling this problem successfully.

Uttar Pradesh is one of the very few States which still allows tiger shooting. While taking such a decision we have considered the present status of tigers in the State in all its aspects.

The adaptability of tiger to various climatic conditions can easily be judged by the fact that it had a wide geographical distribution from the snowy regions in northern part of Asia to the tropical Indian climate. It once lived in eastern Turkey and near the Caspian sea and its habitat extended to the Russian Manchuria. It was also found in the Northern Afghanistan and Iran and into the USSR, near Lake Balkash. The species is not found in the Chinese Turkistan but a few animals still exist in Northern Korea. A different species of tiger is still found in the southern part of Yunnan which lies at the junction of China. Burma and Laos. The tiger is widely distributed in the far eastern region of Asia, especially in Malaya and is known to have penetrated the Indonesian chain of Islands. The tiger territory in India extends from Assam westwards through Bhutan and

Nepal to Himachal Pradesh and from Uttar Pradesh and Rajasthan southwards over the whole peninsula. The species was also found in the Indus valley of West Pakistan but the last animal is reported to have been shot in the last century.

It is apparent that tiger is not inhabited in its habitat by climate or topography. All that it requires is good vegetation cover, perennial supply of water and sufficient food. In India tiger is found in all major types of forests, including the thorny, dry and moist deciduous, semi evergreen and evergreen. Uttar Pradesh which lies between 77.5° and 85° E longitude and 23° and 31.3° N Latitude has an area of 2,94,364 sq.km. Under the wide range of climatic conditions of the state, a large number of floristic zones have developed. An area of 45,711.43 sq.miles which is approximately 15.5.% of the total geographical area of the state is covered by various forest types. The Sub-Himalayan zone and the Tarai tract along the foothills, extending from Siwalik areas to Gorakhpur constitute the main habitat of this animal. The other main tract where tigers are found are the dry scrub and thorny forests of the Vidhyan region in the south extending from Varanasi forests to Bundelkhand area. The tiger habitat in Uttar Pradesh covers roughly an area of 11,125 sq.km. which is distributed as follows among the various forest divisions.

Divisions	Sq.km.	No. of Tiger	
	Tiger area		
Siwalik	670	13	
East Dehradun	470	12	
West Dehradun	260	7	
Total	1400	32	44 sq. km per tigers
Lansdowne	650	36	
Kalagarh	523	24	
Corbett Park	502	45	
Bijnor	376	15	
Ramnagar	865	40	
Tarai & Bhabar	920	16	
Haldwani	600	20	
Total	4,436	196	22.5 sq.km. per tiger
Rohilkhand	40	3	
Pilibhit	860	52	
South Kheri	520	39	
North Kheri	985	50	
Bahraich	340	16	
North Goda	452	37	

Gorakhpur	117	9	
Tota	13,414	206	16.5 sq km per tiger
Varanasi	500	10	
Norther Mirzapur	150	4	
Dudhi	500	9	
Banda	605	18	
Bundelkhand	140	6	
Total	1,895	47	40.0 sq.km. per tiger
Grand Total	11,125	481	23 sq.km. per Tiger

Tiger Population

Only about a couple of centuries back the Sub-Himalayan and Tarai regions and most of the Gangetic plain were teeming with wild life. Tigers were also as numerous and their number ran into thousands – probably five thousand or more. The total tiger population of India, as estimated now in 1969 is nearly 4,000 while the number was estimated at forty (40) or fifty (50) thousand only half a century back. No proper census of tiger population has been conducted in the State. But during the year 1967-68 and 1968-69 efforts were made to obtain as accurate an estimate of the number as possible through enquiries and observations. Detailed questionnaire was given to each Wild Life Guard and assistant Wild Life Warden whose jurisdictions were clearly defined. They were required to enquire from knowledgeable sources like local shikaries, graziers and forest staff about the number of tigers and their movements in specific areas. The information as collected and supplemented by the observations of the wild life staff was complied to give an approximate but conservative estimate. Division-wise details have been given above. The entire habitat of the tiger is divided into the following four zones which represent typical climate and topography. The number of tigers in each zone is estimated as follows:-

1.	Siwalik Region (Includes Siwalik, E. Dehradun and West Dehradun).	32
2.	Himalayan Forest hills (Lansdowne, Kalagarh, Corbett Park, Bijnor, Ramnagar T and B and Haldwani Divisions)	196
3.	Tarai Region (Rohilkhand, Pilibhit, S. Kheri, Bahraich, N. Gonda, Gorakhpur)	206
4.	Vindhyan Region (Varanasi, North Mirzapur, Dudhi, Banda, and Bundelkhand)	47
	Total	481

The above figure of 481 tigers in the State, if anything, is on the lower side as only such tigers about the existence of which there is no doubt, have been accounted for in the estimation. There is no doubt that at least 25% of population must have gone unaccounted and this figure may even be as much as 50% also. Even if we do not take this into consideration, it will be a fair guess to keep the tiger population at 500. The bulk of the tiger population is confined to the Himalayan foot hill and Tarai Regions with every 22.5 sq.km. and 16.5 km respectively having a tiger. Siwalik and Vindhyan Regions are now left with only a sprinkling with 44 sq.km. and 40 sq. km respectively having a tiger. While the forest of Vindhyan Regions were never famous for tigers, the shiwalik Region has suffered a great deal during the last few decades. That the total number of tigers in U.P. has come down to a few hundred from few thousand (around 4 and 5 thousand a century back) calls for immediate probe into the reasons which have lead to this catastrophic state.

ANNUAL PRODUCTION AND MORTALITY

The average life span of tiger has been variously estimated at 18-20 years. The age of sexual maturity of tigers ranges from 3-4 years. It can be safely estimated that the total number of 500 tigers in the State, as many as 100 may be below 4 years age. The ratio of male and female encountered in young tigers has been 1:1. There is no reason to believe that this ratio does not exist when the young ones grow up. In fact the possibility of survival of females is always more than those in males. Under no circumstances, therefore, the number of tigresses can be less than that of males. It is accordingly estimated that out of 400, there must be at least 200 tigresses in the State. If young of a tigress survive, each tigress has a litter at allmost every 2 to 2½ years. A free living tigress that loses her cubs in some mishap is potentially able to have new litter within about 5 months. A tigress gives birth to 2 to 5 cubs in a litter. If from each litter an average of two cubs reach maturity, the average number of young raised per adult tigress per year is one.. Accordingly it is estimated that on an average 100 tigers should be added to the population per year. If the total number of tigers, shot or killed otherwise does not exceed 100, theoretically there is no reason to assign shooting as the main cause of depletion of tiger population. Nearly 60 tigers are shot in the State on the average annually. The total number of mortality on account of natural death, poaching and other accidental reasons can not in any case be more than 10 to 15 per year. As against a total mortality of 75 tigers, we have an intake of nearly 100 tiger, which leaves us with an increase of nearly 25 tigers per year. A general feeling among the sportsmen

who go out to the forests regularly is that in several areas there has been a definite increase in the number of tigers in this State, though there has not been corresponding increase in the number of other game. There are however, some problem areas where the number has not increased even after closure of tiger shooting for over five years. Such areas are mainly in Dehradun forests and elsewhere, where on account of local adverse factors there has been no improvement in the situation. It will be seen that shooting through permits is not responsible for any dissipation of tiger population, if it is suitably regulated and restricted. In fact the causes of general depletion in tiger lie elsewhere.

Reasons for Decline

The one reason for the decline of tiger population which occurs to every mind is continued shooting of tigers allowed in the Reserved Forests. It is believed that closing of tiger shooting for 5 or more years is absolutely indicated as a solution to this problem. Tiger shooting on permit has been allowed in our forests since the last many years. The rules regulating tiger shooting were not as stringent as they are today. An average of nearly 100 tigers was shot annually as the following figures will show from the period 46-47 to 54-55.

Year	Number killed		Total
	Tigers	Tigress	
1946-47	72	44	116
1947-48	55	26	81
1948-49			
1949-50	56	26	82
1950-51	67	27	94
1951-52	65	29	94
1952-53	40	57	97
1953-54	67	39	106
1954-55	61	36	97

The number came down to 73 in 1963-64, but considering the odds against the tiger population, it was decided in 1964-65 to fix a ceiling of fifty tigers which could be allowed to be shot through permit annually. Accordingly with the help of figures available about the number of shooting permits issued and the number of tigers shot during the last ten years, it was decided to close tiger shooting in 64 blocks and permit shooting only in 58 blocks. The procedure of issuing shooting permit at least two months in advance precluded the possibility of keeping the bag limit within 50 but the

number of tigers shot from 1964-65 will indicate definite reduction in the number.

Year	Number killed		Total
	Tigers	Tigress	
1964-65	32	12	44
1965-66	53	11	64
1966-67	38	11	49
1967-68	39	21	60

As mentioned earlier, the number of tigers allowed to be shot has been so regulated that the possibility of extermination of this species on account of shooting has been completely obviated. In the main tiger habitat as given above there are nearly 481 tigers in an area of 11,125 sq.km. which brings on the average one tiger per 23 sq.km. (or 9 Sq.miles). The average density of tiger in the State can be considered as fairly adequate.

We can not increase the number of tigers indefinitely in a limited area without jeopardizing not only their own existence but the existence of other wildlife, domestic cattle and human beings. There is an optimum number of tigers that habitat can sustain. We have only to see if the present habitat can support any more tiger. If it can not, the question of closing tiger shooting and increasing its number in that habitat does not arise. The general depletion in the total number of tigers has been mainly due to the reduction in suitable tiger habitat and deterioration in habitat quality.

In the recent years, vast tracts of land have been cleared for various industrial undertakings, irrigation and power projects. Vast stretches of forests have been felled under the so called 'Reclamation schemes' for expansion of agriculture to meet the mounting pressure of an ever increasing population and to settle refugees. An area covering 1200 sq.miles (3000 sq.km) which formed our best tiger habitat has been clear felled after independence to meet these demands. The tiger has been the greatest sufferer as bulk of the colonization activities were confined mainly to Terai Tracts all along the Himalayan foot hills. However tigers and other wild life were destroyed in these colonization schemes is not unknown. In addition to this direct loss, the extension of cultivation right upto and inside the reserved forests has been responsible for manifold reasons leading to deterioration of habitat and destruction of wildlife. Vegetation has been ruined by men and cattle and wildlife has been shot and snared under the pretext of crop protection.

Intensive forest exploitation and raising of plantations of industrial

importance are the other two factors responsible for reduction of tiger habitat. There is hardly an area in the forest which is free from human activity. Marking of trees, regular fellings, silvicultural operations, dry markings and fellings, drift wood marking, petty demand sales, extraction of grasses, lopping and grazing by gujars and their buffaloes, etc., go on all over the forest. A shy animal like tiger can not live peacefully under such disturbed conditions. It is either on the move during the days also or seeks refuge in the adjoining sugar fields where interference is comparatively absent. In fact tigresses have been seen to breed and rear their cubs in these fields quite frequently. As if these activities were not enough, large scale plantations are taken up every year in these areas, which involve clear felling of several thousand acres at a stretch. Every year nearly 24,000 hectares are being clear felled and planted. One can imagine how adversely the destruction of natural habitat must be affecting the tiger population of the state.

While large scale shooting and poaching in the past were also responsible for bringing down the tiger population to the present stage, effective shooting restrictions and vigilance have more or less completely cut down destruction of tiger population on this account. We can claim with confidence that no more than 10 tigers, if at all, are shot annually by poachers and others clandestinely. Poaching of tiger now ceases to be an important adverse factor in this State.

How tiger is protected in Uttar Pradesh

Regulated shooting of tigers in selected shooting blocks is allowed in Uttar Pradesh after careful consideration of the conditions relating to its preservation and multiplication. The position is reviewed regularly and suitable steps are taken in time. In fact as mentioned earlier, necessary measures for the protection of tiger have been taken in stages since the last many years and these have been intensified during the last ten years.

In early thirties the 'Association' for the Preservation of game in U.P.' was formed under the patron ship of Sir Malcolm Hailey, Governor of United Province with such noted naturalists as Jim Corbett and Hasan Abid Jafry as Hony. Secretaries. Much useful work was done by this association and as result of its efforts and recommendations the (Hailey) Corbett National Park, a tiger refuge in the real sense, was constituted in 1935., The area of this park was extended in 1966 from 125 sq.miles to 201 sq.miles to include the adjoining areas rich in tiger population. In addition there exist at present 6

other sanctuaries, which include ideal tiger habitats, spread over the State from Dehradun to Varanasi. These sanctuaries provide breeding areas and the Corbett National Park can be considered as the nursery for the tigers. There is no doubt that the overflow of tigers on account of regular annual breeding in the park is naturally distributed in the adjoining forests of Kalagarh, Lansdowne and Ramnagar divisions. One has only to enquire from the adjoining villages to find out how the tiger population has increased in their forests

Out of a total of 122 shooting blocks 64 blocks were closed to tiger shooting during 1968-69 season. In the coming shooting season of 1969-70 eight (8) more blocks have been added to the closed list. Such blocks which were either overshot or which are considered to provide good breeding areas included in this list. Some of the blocks can be and are reopened after 5 or more years and in their places equal number or more shooting blocks are closed. This periodical and rational closure gives and provides them an opportunity to breed and multiply unmolested.

Tiger shooting is closed from 1st June to 15th October. From the coming shooting season 1969-70 the month of May has also been included in the closed period. Thus no tiger shooting is allowed in the State for nearly six months in a year. Male tigers 8' and female below 7' are treated as tiger cubs and no one is allowed to shoot them. Shooting of tigers is allowed during the day only between sun rise and sunset. Tigers are not included in the bag limit allowed under shooting permit unless the applicant possesses rifle of 375 magnum or 400 bore non-magnum and above with at least 300 grains bullet weight and above. Carrying of slugs and buck shots is prohibited. Not more than one tiger is allowed on a permit and no one can have more than two blocks in a year. Tigers can not now be declared as cattle lifters arbitrarily. If a tiger has killed and that too within a period of six months, then only a tiger can be declared a cattle lifter. Other measures like imposing of enhanced royalty on tigresses, fixing the number of elephants a permit holder can use in beats and declaring animals shot in protection of self and poverty are on way. These measures though fairly adequate need regular strengthening. Their strict and rigid enforcement has saved our tiger population from dissipation.

Conclusion

Tiger is surviving in this State against various odds on account of its hardness, cunning and seclusive habit as also on account of the protective measures taken in Uttar Pradesh. While there is no room for complacency,

there is hardly any reason to be pessimistic about its future survival. Continued vigilance and proper management will not permit destruction of tiger at the hands of poachers or pseudo shikaris. The greater danger to tiger comes from another quarter, viz, growing civilization and intensive exploitation of forests. If we go on loosing tiger habitats to cultivation, colonies, industrial projects and plantations, no one can save tigers in this State even if shooting by permit is completely closed. Future of tiger, therefore, lies only in the protection of its habitat.

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